The Journal of Occupational Diseases and Traumatic Surgery

Industrial Medicine

for

Physicians and Surgeons in Industry

Volume 6 APRIL, 1937 Number 4

THIS ISSUE

Fractures
—of the Lower End of the Radius—

Circulatory Diseases
—of the Extremities—

Gas Gangrene
—Early Recognition and Effective Treatment—

Syphilis in Industry
—One of Its Major Health Problems—

Cerebral Arteriosclerosis
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Mental Attitudes
—Their Relationship to Industrial Accidents—

Pre-Existing Syphilis
—As an Intervening Cause in Workmen's Compensation Cases—

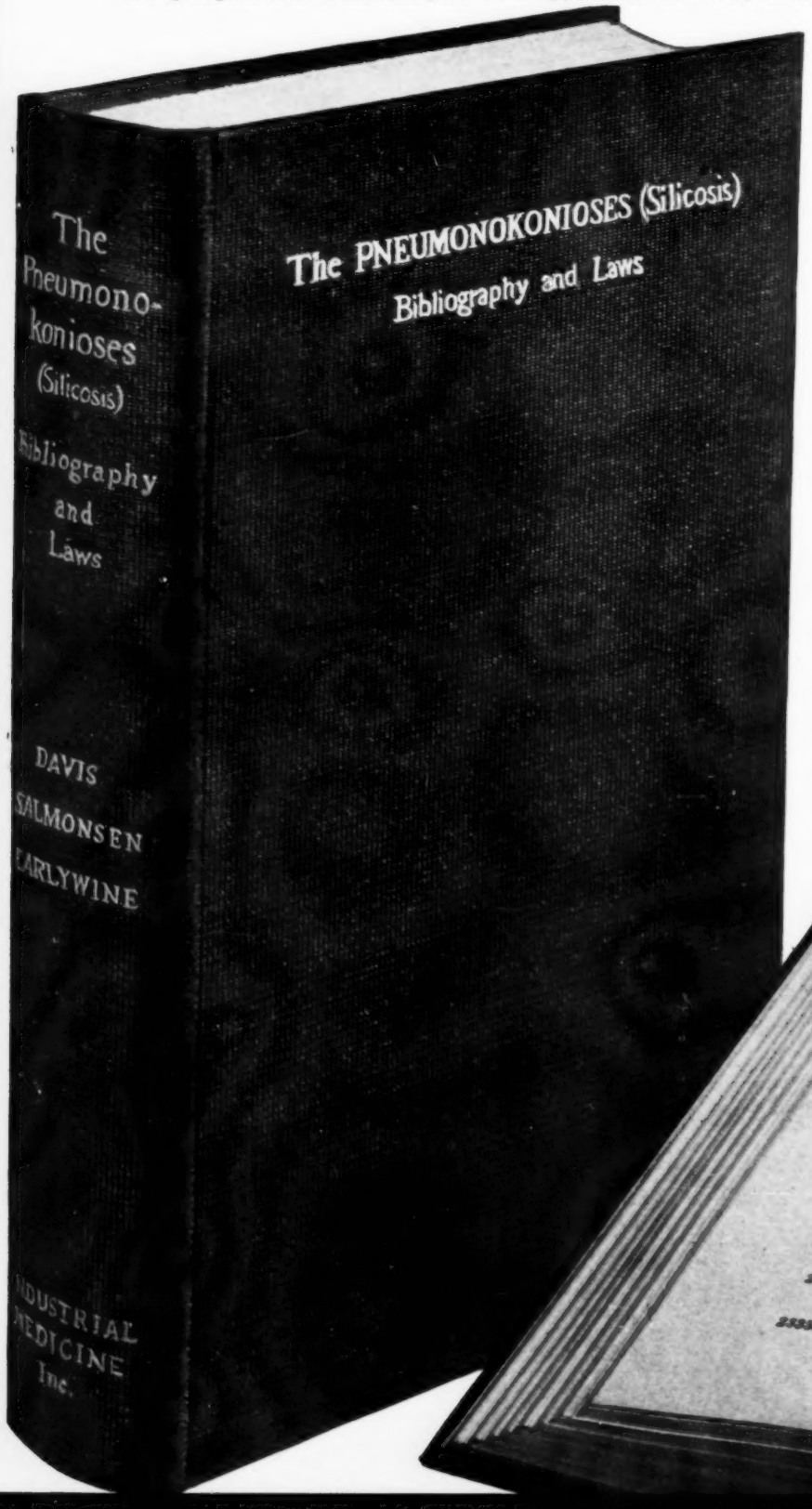
Midwest Occupational Disease Conference
—and the Twenty-Second Annual Meeting of the American Association of Industrial Physicians and Surgeons—

The Pneumonokonioses (Silicosis)

Bibliography *and* Laws Book No. 1

All the References of the World's Literature
--- from 1556 to December 31, 1933 ---

Review from **"Staub"**, (Dust), 1, No. 1:167-168, April, 1936, done by Dr. Ing. O. M. Faber, Berlin.
No. 115. Bibliography and Laws upon Silicosis. **(The Pneumonoconioses (Silicosis) Bibliography and Laws)**, by Geo. G. Davis, E. M. Salmonsen and J. L. Earlywine, published by **Industrial Medicine**, Chicago, Ill., 1934, 482 pp. ($7.50).
The **Forword** is by E. R. Le Count, Chief of the Department of Pathology, The University of Chicago. The book has two main divisions. Part I is a Bibliography of the collected literature of the world upon the **Pneumonoconioses (Silicosis)**. Beginning with the **De Re Metallica** of Agricola (1556), it ends with 1933, inclusive of 2,768 sources, whose title, author and exact citation are given. The works are chronologically arranged. Through subdivision into different groups, the works of authors appearing in the same year are clearly and immediately perceived. Within the groups the works are still arranged in alphabetical sequence by authors. These 276 pages of comprehensive bibliography are followed by a complete **author—**and **subject—index.** Besides, the location (orientation) of any expert treatise and the year of its appearance are easily made out at a glance.



In Part II, the Laws of the several States of the Union in North America, as relating to Occupational Diseases, the injuries they cause, and any pertinent material, are all represented. The plan and sub-divisions by which the situation can be ascertained for any one of the 48 states of the United States of America, are readily apprehended. In several cases corresponding paragraphs have cross-references. Especially valuable and complete is this legal survey for ascertaining any characteristic verdict (judgment) in respect of a pneumonoconiosis, showing the basis of the action, the conditions giving rise to the action, as well as the principle involved in the decision—for any state in the Union. The book closes with an alphabetical summary of the enterprises concerned in the juridical distinctions (or decisions.)

Examination of the book compels recognition of the extraordinary care and pains taken by the compilers. Random tests here and there show that for a space of 377 years this bibliography has attained a completeness not hitherto arrived at. Probably no branch of any other science has at its disposal so flawless and richly extensive a bibliography. It is authoritative not only for physicians and industrial experts, but also for physicists, engineers, and employers of industry. The format is entirely appropriate; for the arduous work involved the compilers should receive the fullest recognition.

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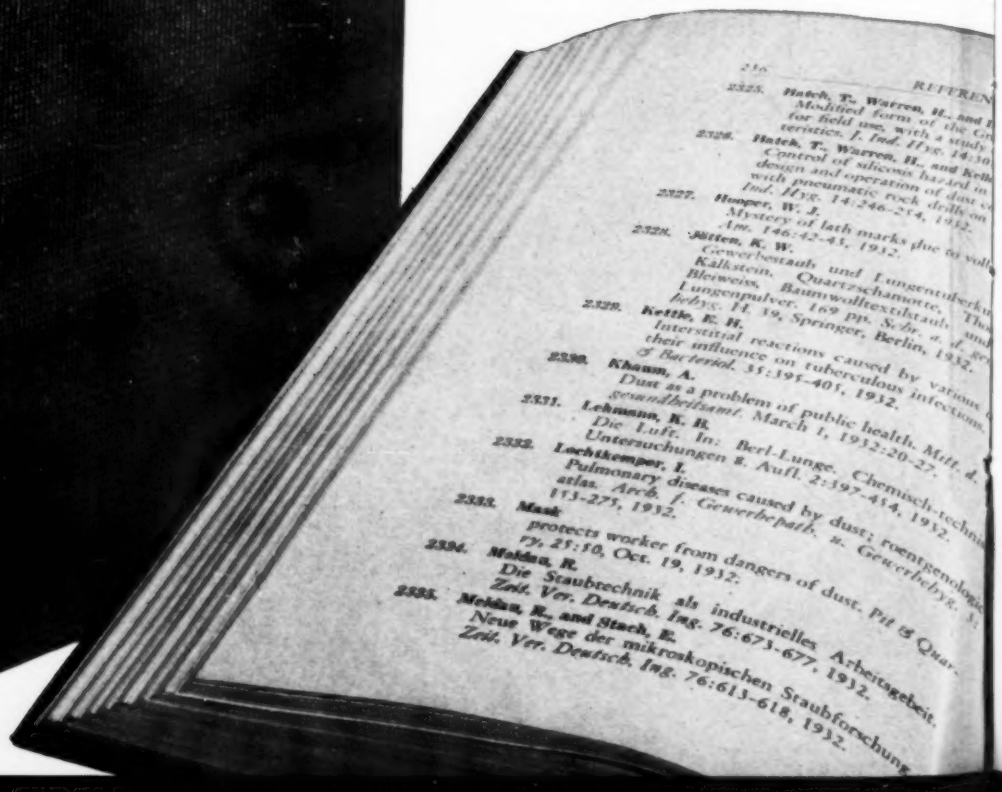

The

Pneumonokonioses (Silicosis) Book No. II

—Literature and Laws of 1934—

International Abstracts, Extracts and Reviews of the 1934 Literature of the Pneumonokonioses and Their Allied Diseases and Subjects—Plus the 1934 Bibliography.

Compiled by

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The Wisconsin Medical Journal

BOOK REVIEW

The Pneumonoconioses (Silicosis). Literature and Laws of 1934. By George G. Davis, M.D., Associate Clinical professor of surgery, Rush Medical College, University of Chicago, attending surgeon Cook County Hospital.

A year ago Dr. Davis and his collaborators published Book I which listed, with few exceptions, all the references to pneumonokonioses from 1556 to 1933 inclusive.

The present volume (Book II) furnishes a review of the literature and laws of 1934. Whereas Book I merely cited references, the present work furnishes an abstract of each article. The work is complete. There is a total of 396 references. In addition, the bibliography, not included in Book I, is included. There are good subject and author indexes.

This volume together with Book I will be very valuable to workers in this field. The extensive literature of but one year is indicative of the wide and increasing interest that this subject holds. Compilation of this book has been a worthwhile project. O. O. M.—*Issue November*, 1935.

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WE ANNOUNCE, on one of the cover pages of this issue, the new textbook on "Toxicology", by DR. WILLIAM D. MCNALLY, of Chicago. This book is being published by *Industrial Medicine* and will be forthcoming in about three months. It represents on DR. MCNALLY'S part the work of many years, and crystallizes the laboratory and anatomical research which has been his vocation and avocation for two decades. The scope of the book is so complete that, with reference to everything the doctor needs to know about Toxicology in all its phases —usual and unusual, ordinary and remote—it is literally the case that you have only to "Name Your Poison" and then look in DR. MCNALLY'S book to find out all about it. There is a foreword by DR. CAREY P. MCCORD, himself a toxicologist of the first degree . . . The pages of this issue contain a liberal number of what we like to call "pregnant sentences". Among them is one (but not the only one) in DR. ELLER'S article on "Syphilis in Industry." He says: "Like the public health officer, the industrial physician is first and foremost the defender of those who still enjoy health. His duty is to keep intact the physical fitness of every component part of the industrial machine." That is a proper statement of the place of the industrial physician and surgeon in the scheme of things as we live them. With the difference, however, that the industrial physician's safeguarding is individualized, where the health officer's is not. To the extent the doctor in industry realizes and applies the truth of this profound remark, he is destroying whatever meaning there may be in the criticism that he does not do enough "preventive medicine". Our January number had another article by DR. ELLER on "The Curability of Syphilis" . . . Also among those "pregnant sentences" is the following, in DR. FORSTER'S article: "Whatever may be the immediate proximal cause of an accident, on thorough investigation the underlying cause will, in the majority of cases, be found to be some mental aberration on the part of the worker resulting in inattention, carelessness, confusion or

COMING

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—Yawata Steel Works, Yawata City, Japan—

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bad judgment. You cannot put a protecting fence around these mental attitudes as you can around a band saw." Here, DR. FORSTER says *the fundamental*—there is a *cause of causes* in every circumstance. Years ago an outstanding example of this occurred in railroading. A wreck was found to have been the sequel of five very slight omissions on the part of one man each, the cumulative effect of the five in the order in which they happened resulting in deaths, injuries and damage which the proper attention to routine detail, a little less carelessness, *on the part of any one of the five* would have prevented. The mental hazard! . . . DR. FULK'S presentation is the subject matter of a lecture he has delivered many times. He also forcibly emphasizes the mental hazard . . . By special permission of the *Chicago Tribune* we include in this issue DR. CUTTER'S leading article in the *Tribune's* Health Column, which appeared Eastern morning. It is entitled "A Philosophy of Life". Not only is it interesting in and of itself, but it is also and more deeply interesting because it is the sincere thought of a medical man concerning the eternal verities—for the physician, being so strongly an individualist is not to be criticized if he becomes also a materialist. Yet so many of the things he does in his routine of practice are predicated upon phenomena which he does not understand, and can only—along with the rest of us—believe! . . . The collection of leading workmen's compensation cases in "Pre-Existing Syphilis" very effectively suggests that industry not only may, but also must, give this subject a great deal more attention from now on, if the ever-mounting cost of compensation is to be kept within reason. In the face of its importance as an element of indirect cost in industry, there is not much room for complacency on account of the fact that syphilis has not yet been proved an occupational disease—at least to the extent that it is the hazard of any occupation which industry, as it is generally defined, is responsible for . . . Our May number will be devoted very largely to the Midwest Conference on Occupational Diseases, and the Twenty-Second Annual Meeting of the American Association of Industrial Physicians and Surgeons. The last number included the tentative programs of both occasions; this number includes the programs as they will be given. The fact that the papers presented at these meetings can be read, and the meetings themselves read about, in these pages should not be any reason for staying away from the Conference. We repeat what we said about it last month: That it will prove at very least the outstanding event of the year.

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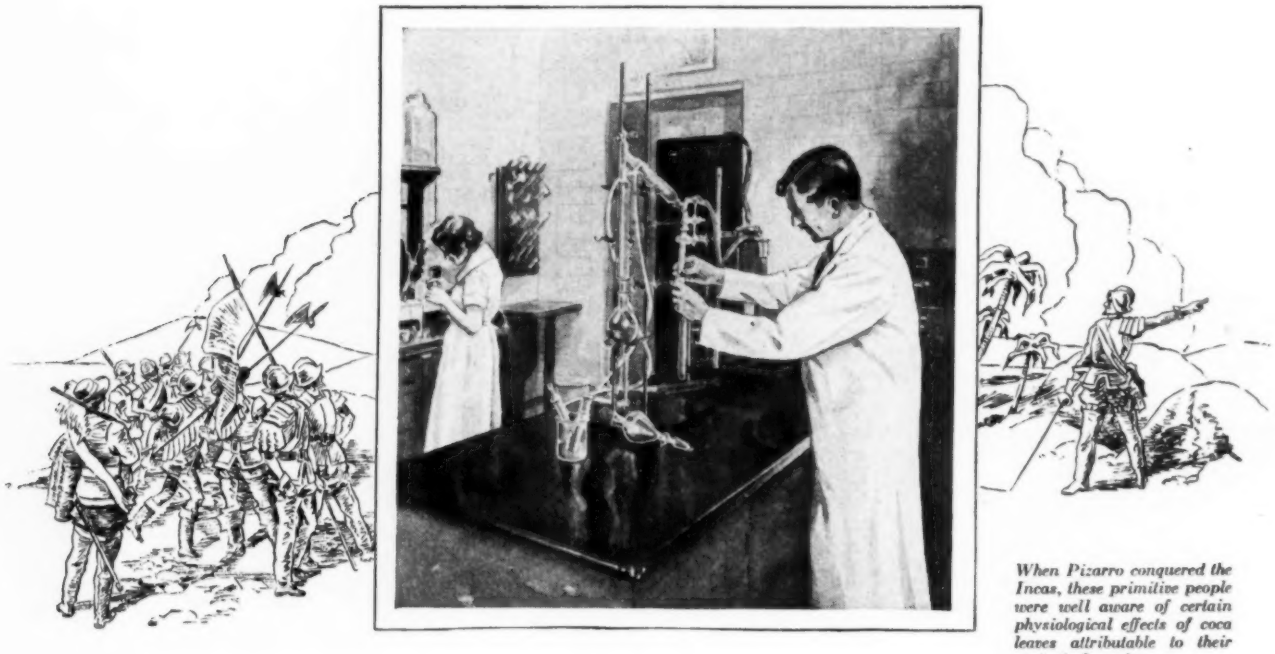

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The Journal of Occupational Diseases and Traumatic Surgery

The Science, the Law and the Economics of Industrial Health

Volume 6 APRIL, 1937 Number 4

Fractures of the Lower End of the Radius

—With Particular Reference to Successful End-Results—

RALPH M. CARTER, M.D., F.A.C.S.,
Green Bay, Wisconsin

ACCORDING to the statistics of Malgaigne and Bruns, fractures of the lower end of the radius constitute 10% of all fractures, thus making them the most frequent of fractures in general. By reason of their frequency, for one thing, and also because the treatment apparently offers no particular difficulties for another, most of these cases are treated by the general practitioner, and do not ordinarily get into the hands of the orthopedist or bone surgeon.

The fracture with which this paper deals is that one which occurs within an inch or less proximal to the lower articular surface of the radius, with or without fracture of the ulnar styloid,—the relatively simple, ordinary fracture which is commonly seen following falls on the outstretched hands, and other similar forms of violence. Such a fracture is frequently referred to as a "Colles' fracture"; since Colles' original paper described a lesion occurring about one and one-half inches above the carpal extremity of the radius, this use of the term is not strictly accurate. However, such usage is general, and probably connotes to most physicians the condition which is the subject of this paper. The so-called reversed Colles', the fractures of the lower ends of both bones, and other severe forms, all present individual problems of treatment; on account of their severity, they may frequently give rise to unpreventable permanent disability, and do not enter into the scope of this discussion.

In spite of their frequency, and in spite of the mass of literature which has been written upon their treatment, these fractures remain notorious for unsatisfactory end-results. In recent years, with the advent of workmen's compensation legislation, and with the accompanying necessity for closer scrutiny of end-results, this fact has been brought to light in no uncertain manner.

In many cases, this crippling may not reach a high degree; if it did, possibly more attention would be paid to treatment, in an endeavor to overcome it. But all too frequently, cases of fracture of the lower end of the radius are seen, particularly in older individuals, which have been left with swollen, stiff, and painful wrists, with marked radial deviation of the hand, and with stiff, painful fingers, in which motion is markedly restricted. Such a condition constitutes a very real functional disability, and can be avoided in most cases.

The reason for all this, I believe, is that in the average case, the fracture, *as a fracture*, is not taken seriously enough. In our student and intern days, many of us were taught and came to believe that "Colles' fracture," so-called, was a relatively simple and easy condition to treat; that in many cases, no reposition or reduction was necessary, and that all one had to do was to apply splints or a plaster cast, and let Nature do the rest. It would appear that such a belief still prevails pretty generally, and that it is fostered by the not infrequent report of the radiologist which reads, "fracture of the lower end of the radius in good position." Naturally, this applies only to those cases, and there are many such, without obvious dorsal displacement of the distal fragment; if such displacement is present, it is always reduced, but in far too many instances, the end-results still leave much to be desired. By an analysis of the fracture, it can be shown why this is true, and how it may be avoided.

At the present time, my own views on this subject are as follows: (1) fractures of the lower end of the radius can be satisfactorily treated if due attention is paid to certain details which are commonly overlooked; (2) practically without exception, every case requires reposition or correction of the position of the fragments to a greater or lesser degree; (3) to determine the amount of correction necessary requires a careful study of good x-ray films; (4) these fractures cannot be satisfactorily maintained in position by ordinary splints, but require well-fitted plaster ones, and finally, (5) that if the so-called "functional treatment" is properly carried out, massage and passive motion are not necessary. Undoubtedly this last statement will be looked upon as rank heresy by many, but personal experience, and that of many others, fully justifies it. If the above conditions are fulfilled in the treatment of fractures of the lower end of the radius, the average of end-results will be decidedly better than now obtains.

IN ORDER to appreciate fully just what takes place when the lower end of the radius is fractured it is necessary in the first place to have exact knowledge of the normal anatomy of the bone, particularly regarding certain details and relationships which are not always emphasized to the de-

gree that their importance very often warrants.

If an antero-posterior x-ray film of a normal wrist is examined, (Fig. 1), it can readily be seen that the lower articular surface of the radius is not perpendicular to the axis of the shaft, but presents a definite angle of inclination to this axis. If a line is drawn on the film representing the axis of the bone, and if this line is intersected by another line connecting the most distal radial and ulnar points

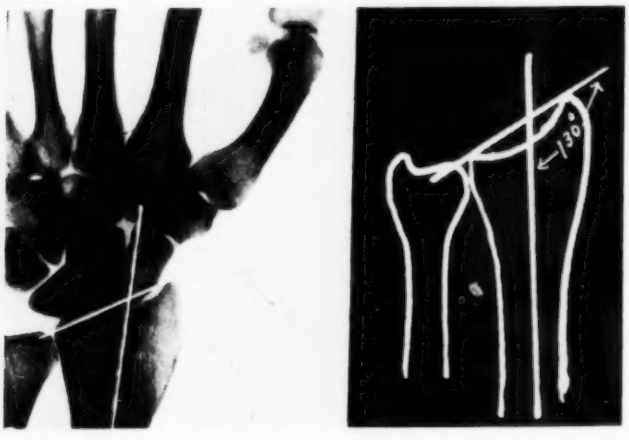


Fig. 1. Antero-posterior x-ray film of normal wrist

of the articular surface of the radius, the normal angle of inclination is found to be about 130 to 135°. This angle may vary somewhat from 120° in some individuals to an occasional one in which it is greater than 135°. But the latter figure represents the average.

When a lateral view of a normal wrist is examined, (Fig. 2), the lower articular surface of the radius is seen to present a slight volar inclination of about 5°. This is again brought out more clearly if the longitudinal axis of the radius is drawn on the film, this axis being then intersected by another

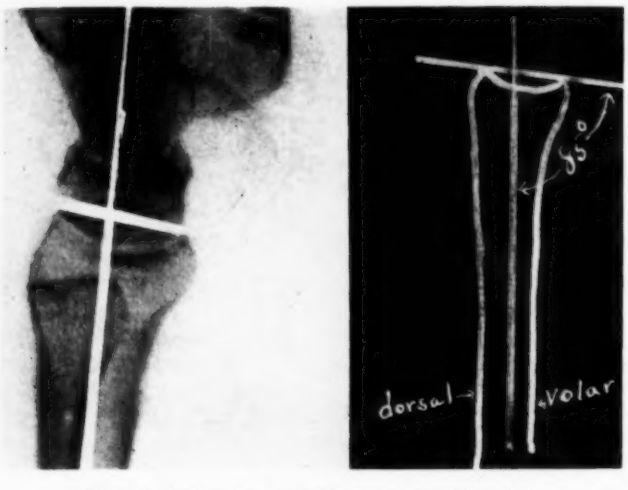


Fig. 2. Lateral x-ray film of normal wrist

line connecting the most distal dorsal and palmar points of the articular surface. The intersection of these two lines forms an angle of about 85°, and this angle is practically constant for all individuals.

In order intelligently to treat a fracture of the lower end of the radius, these relationships of the articular surface to the shaft of the bone under normal conditions must be known and kept clearly in mind, as will be seen when the displacement following a fracture is considered.

In analyzing this displacement, taking first a lateral x-ray film of a typical fracture, (Fig. 3), it is immediately apparent that there is an actual dorsal displacement to a greater or lesser degree of the entire distal fragment; this gives rise to the "silver-fork" deformity, formerly strongly emphasized as a characteristic diagnostic sign. Accompanying this displacement, there is usually

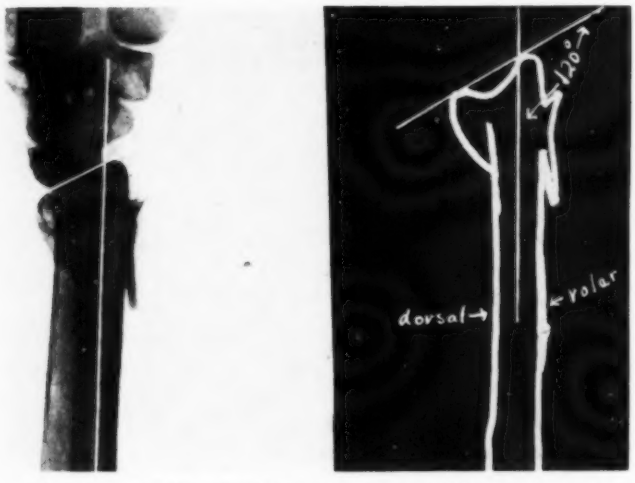


Fig. 3. Lateral x-ray film of fracture of the lower end of the radius

some degree of impaction of the proximal fragment into the distal one. In addition to this, however, and this is not infrequently overlooked, particularly in the slighter degrees, there is a dorsal rotation of the distal fragment about a transverse axis running approximately through the line of fracture, thus giving rise to a change in the relationship of the lower articular surface of the radius to the axis of the bone. As was stated above, normally this angle is about 85°; following fracture, it becomes greater than 90°, usually about 120 to 130°, or even more.

On the antero-posterior film of the same fracture, (Fig. 4), there is seen to be an external lateral

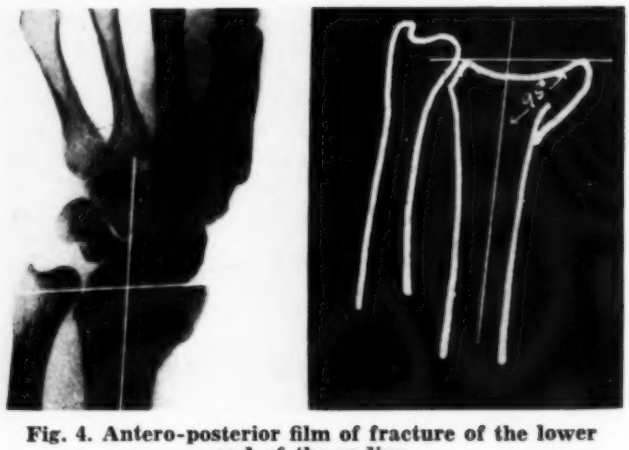


Fig. 4. Antero-posterior film of fracture of the lower end of the radius

displacement of the entire distal fragment, which gives rise to the radial deviation of the hand so commonly seen in these cases; furthermore, seen in this plane also, there is a change in the articular surface-shaft angle. Instead of this angle being the normal 135°, it may be decreased to 110, 100, or even 90°. It is thus apparent that, instead of the displacement in these fractures being a simple one in a single plane, when analyzed, it is frequently found to be somewhat complicated, and made up of several components. Depending upon the ex-

tent and degree of the fracture, one or all of these components may be present. The higher grades of deformity are easily recognized. For the recognition of the lesser degrees, it may be necessary to construct the axis lines by means of a transparent ruler.

Each of these components of displacement lends its share in giving rise to disability, and each of them must be corrected and overcome in order to obtain the best possible end-results. It is obvious that every case of fracture of the lower end of the radius does not present all of them; there is one, however, which is practically constant to the type of fracture under discussion, and that is the dorsal tilting or rotation of the lower articular surface. Although apparently a minor displacement, it is important and, if uncorrected, gives rise to a marked limitation of palmar flexion; there is likewise a permanent distortion of the wrist joint itself as a result, and we know that in such joints, particularly in older individuals, osteoarthritic changes are later prone to develop, thus leading to a progressive increase in the original disability.

As in every other fracture, the object of treatment in these cases is to restore the fragments of the bone to as nearly normal relationships as possible, to retain them in the corrected position until union has taken place, and to realize, at the same time, that the fractured bone is not the only structure in the part which is the seat of a pathological process. The soft tissues have also been traumatized, and the dressing which is applied to immobilize the bone ends must be one which will not interfere with the normal recovery of these other structures. Such a dressing is the unpadded posterior plaster of Paris splint, applied in the manner recommended by Boehler, of Vienna, and which will presently be described.

FROM what has previously been said, it should be apparent that the first step in the treatment of these fractures is a careful study and analysis of satisfactory antero-posterior and lateral x-ray films. By this, the components of displacement which must be corrected are determined, and the proper maneuvers for reduction intelligently planned.

Some form of anesthesia is always necessary. This may be local or general, according to the preferences of the operator. Unless there is some contra-indication, my own preference is for gas and ether; I feel that thereby better muscular relaxation is secured, making reduction easier; furthermore, if the x-ray films which are always taken immediately after the dressing is applied show that the reduction is unsatisfactory, a correction can be readily made at the same sitting.

The patient lies on an operating table (Fig. 5). To assure a firm, non-slipping grip during traction, the thumb is wrapped with a layer of adhesive tape; for the same purpose, the index, middle, and ring fingers are likewise bound together with adhesive tape, care being taken to see that these fingers do not overlap. Muslin bandage secured to the skin by skin glue may be used instead of the adhesive if desired. Traction is useless if it is unopposed by efficient counter-traction. This cannot be obtained unless the arm is fixed, with the elbow flexed, in which position the greatest relaxation of the forearm muscles is obtained. If, as is sometimes the case, traction is made on the extended arm, the muscles are not completely relaxed, and the only counter-traction thus available is the weight of the shoulders and head. This is both inefficient and unstable. To secure proper counter-traction, with the patient lying supine, the upper arm is extended laterally from the body, at the level of the shoulder; the elbow is flexed to a right angle with the palm of the hand directed toward the floor, which represents the mid-position between pronation and supination. A pad made of a folded towel is placed on the anterior surface of the upper arm above the bend of the elbow; over this towel is passed a broad sling made of a long folded towel or pillow slip, and the ends are given to an assistant who stands near the head of the table.

The operator now grasps the thumb of the patient with one hand, the index, middle, and ring fingers which have been bound together as described with the other; the little finger is left free. Against the counter-traction offered by the sling about the upper arm which is held by the assistant, he exerts a strong, steady pull. This is continued for three to five minutes with no interruption; it has the effect of securing complete muscular relaxation and of overcoming any muscle spasm which has not been entirely abolished by the anesthetic; very frequently it also separates impacted fragments, and partially, if not completely, reduces any dorsal dislocation of the distal fragment which may be present. The hand is next turned over to another assistant, who grasps it in the manner described, and continues the steady traction while the operator, by manipulation, completes the correction of all displacements which have been shown to be present by the preliminary analysis of the x-ray films. When reduction is complete, as a rule there is little tendency to displacement of the fragments.

Fig. 5. Position for reduction of fracture of the lower end of the radius

A plaster of Paris splint is now prepared in the usual way, using a bandage six inches in width; it should be long enough to extend from the knuckles of the hand to just below the bend of the elbow on the forearm. Eight to 10 layers of bandage make a splint which is sufficiently heavy.

The arm is again turned over to the assistants for moderate traction, with the wrist in mid-position, and with slightly more pull exerted by the hand which grasps the thumb than by the hand grasping the fingers. This tends to overcome the radial deviation. If this radial deviation is very pronounced, it is also sometimes well to impart a slight ulnar deviation to the hand as the plaster is setting.

A small gauze pad, the purpose of which is to

prevent irritation of the skin by the bandage, is placed between the thumb and index finger. The plaster splint is now smoothly applied over the extensor surface of the forearm, which is uppermost, and held in place by a gauze bandage (Fig. 6). While the plaster is setting, the splint is molded closely and accurately about the wrist, forearm, and hand. Until setting is complete, and during the molding, steady, moderate traction must be maintained.

On account of its width, such a splint applied as described, will encircle at least three-fourths of the circumference of the average wrist, leaving an area on the flexor aspect which is uncovered by plaster. This area amply provides for good circulation, but since the plaster is accurately molded to the contour of the bone, redisplacement of the fracture cannot occur, as may easily happen with any other form of splint. X-ray films are now taken to determine the accuracy of the reduction; if it is not satisfactory, the dressing is removed, the fracture is again manipulated in the manner indicated, after which the splint is reapplied.

For the first 12 to 24 hours following the application of the dressing, the hand must be closely watched for swelling and discoloration of the fingers, or other evidence of circulatory disturbance. These occasionally occur, and in such cases are due, not to the pressure of the splint, but to the fact that the gauze bandage holding it in place has been too

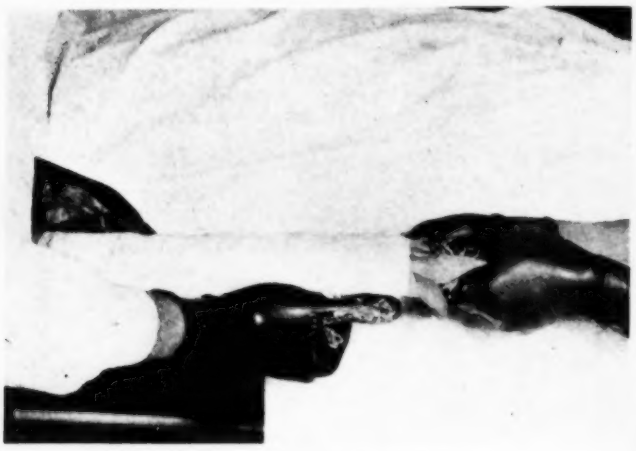


Fig. 6. Application of posterior splint

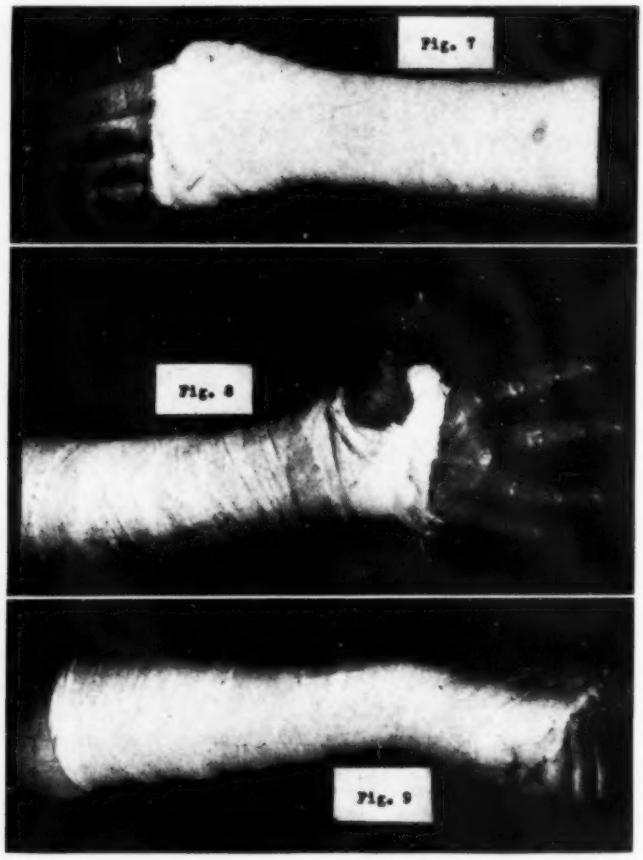
closely applied. Under such circumstances, all that is necessary to be done is to remove this bandage, and reapply it more loosely; the splint remains in place during the procedure, and redisplacement cannot occur.

The following day, the dressing is completed by the application of a starch bandage; for this, a bandage made of the crinoline used in making plaster is excellent. Such a bandage, when it dries, becomes somewhat stiff; it holds the turns of the gauze bandage firmly in place, and does not soil so readily. After it has dried, bandage and plaster are cut away about the base of the thumb so that the latter can be freely moved in all directions; in the palm of the hand, the bandage is cut away as far as the distal transverse fold of the palm, so that the fingers may be completely flexed to form a fist. The upper end of the dressing is also cut away sufficiently, if necessary, so that the forearm may be completely flexed (Figs. 7, 8, 9).

This dressing remains in place for from three to five weeks, according to indications. It can usually be dispensed with earlier in younger individuals than in older ones; in fractures with much comminution and splintering, it will have to be left on longer than in simple ones.

The after treatment begins immediately, and this is summed up in continuous, active use of the extremity from the very beginning. With a dressing such as has been described, this can be very easily done. No sling is ever used after the first 48 hours, and even then, only as a mild concession to certain patients who feel that they must have it.

Stiffness following fractures of the lower end of the radius results from imperfect reduction and from adhesions of the flexor and extensor tendons in their sheaths. Ordinarily an attempt is made to



Figs. 7, 8, 9. Completed dressing, showing mobility of fingers

overcome this stiffness by a comparatively short period of passive motion daily. In many conditions, passive motion is invaluable, but its happiest results are not obtained by using it in fracture of the lower end of the radius. In the first place, if begun immediately following reduction, as it should be to obtain the fullest benefit, there is great danger of redisplacement of the fragments. This danger is generally recognized, and the passive motion is ordinarily not undertaken for a week or 10 days. By this time adhesions have formed. In the second place, passive motion for a comparatively brief period each day cannot compare in benefit with continuous active movement of the fingers through the greater part of 24 hours.

Therefore, from the beginning, each patient is instructed in the active use of his injured arm. To prevent stiffness of the shoulder from a dependent position of the arm, and to exercise the elbow, several times a day, he elevates the arm and puts

the hand back of his head; he also puts his hand behind his back. It is demonstrated to him that he is able to flex and extend and separate his fingers; he is shown that he is able to grasp a door knob, and by turning it, to keep pronation and supination active. He uses his hand fingers in eating, and in all light tasks which he finds himself able to perform. When the dressing is finally removed, very little stiffness is found to be present, and this usually disappears completely within 10 days to two weeks.

Circulatory Diseases

—*of the Extremities*—

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MY SUBJECT includes circulatory diseases of the extremities, but in this dissertation I would like to confine myself to a discussion of Buerger's disease, because I have made detailed studies on two patients sent to me by the late Dr. Pulver, of the Chicago & North Western, which illustrate a number of important things regarding this particular disease.*

The one patient had been diagnosed a Buerger's disease clinically, and was proved at postmortem to have had Buerger's disease.

The other had been diagnosed Buerger's disease by a number of physicians and received the various types of treatment advocated for this disease without results, and later studies indicated that in all probability he never had it.

Buerger's disease is variously defined, but pathologically the essential lesions are medial and adventitial infiltration with foci of round cell infiltration followed by fibrosis and tendency to thrombosis with organic occlusion of the blood vessels. It occurs most commonly in young and middle-aged males between the ages of 20 and 55 with a predilection for Russian and Polish Jews, but it occurs in all races, and particularly in those who are heavy smokers.

Before presenting the case reports, it is necessary to give a brief description of the instrument used for the measurement of the peripheral circulation.

This instrument, a special digital plethysmograph, makes a permanent calibrated graphic record of the volume changes of the fingers or toes. With each heart beat, the volume of these structures becomes larger by the amount of blood which passes into the structure, and the instrument measures this change in size. The ability of the vessels to dilate can be measured following the application of heat or nerve block, and in this manner it is possible to differentiate functional spasm and organic change in the peripheral blood vessels.

THE first patient on whom I wish to report had Buerger's disease and gave the following history:

E. M., aged 40, white male, was admitted to St. Luke's Hospital as a private patient of Dr. Pulver on April 25, 1935, and died on May 28, 1935. The chief complaints were soreness and swelling of the left foot. For the previous 11 years he had had trouble with the left foot. He could walk only about a block when the foot and leg became tired, but there was no pain or edema. He would rest three or four seconds and then could walk another block, when he would again have to rest. In the summer of 1934 he noticed that the left foot "went to sleep easily," but there was no pain present. In September, 1934, he began to get shooting pains down the leg from the knees to the toes. These became virtually constant, and were relieved somewhat by letting the leg hang down. Last winter (1934-35) he froze his foot five times from only moderate cold, and states that he could not seem to keep his foot warm. Up to January, 1935, when he sought medical care, the left foot appeared grossly as good as the right. He was given medicine without relief. On February 16, 1935, he had an operation on his left foot, the incision of which never healed. Shortly after this, he developed sores on the toes of the left foot. He then had 35 "Pavex" treatments, which gave him so much pain they had to be discontinued. Following this, he received five injections in the arm, after which the left foot began to swell. He had been crippled since that time.

In the immediately-preceding four years he had had felons on the second finger of the left hand and the second and third fingers of the right hand, and on entrance to the hospital was still able to extract pus from the second finger of the right hand. The finger nails of the second fingers of both hands had come off seven times in the four years.

The other past history is essentially negative except that he froze his left foot eight years ago.

The family history is negative. His father was American born, but of English, German and Irish descent. His father died of a bowel condition at the age of 59. His mother was American born, but of German extraction, and died at the age of 68 from an unknown cause.

The patient smoked a great deal, averaging one package of cigarettes per day.

Physical examination was essentially negative except for the extremities, and I shall limit my discussion to these. The patency of the peripheral vessels as determined by palpation was as follows:

	Right	Left
Radials	†	0
Ulnars	0	0
Brachials	†	†
Femorals	††	††
Popliteal	0	0
Dorsalis pedis	0	0
Posterior	0	0

The blood pressures obtained in the extremities were as follows:

	Right	Left
Arms	138/ 88	138/94
Legs	166/100	could not be obtained

EXAMINATION OF THE LEFT LEG: In the region of the instep there was a chronically infected ulcer which was the site of an operative scar that failed to heal. There were gangrenous ulcers on the first, second and fifth toes. The foot was edematous to the ankle. In the dependent position, the foot assumed a dusky red color which on elevation became blanched or cadaveric in color.

* Presented before the Congress of Railway Sugeons: Meeting of the Association of Surgeons of the Chicago & North Western Railway, and the Burlington Surgeons, Chicago, November 6, 1936.

The results of the peripheral vascular studies indicated a marked impairment of the circulation in all of the extremities. The electrocardiogram also gave some evidence of myocardial damage.

A parvertebral nerve block was done by Dr. Harry Mock, which proved futile, as the gangrene spread up the leg. The patient developed a blood infection and on May 28, 1935, died.

A postmortem examination was done by Dr. Hirsch. The larger blood vessels of the arms were dissected out to the wrist and those of the leg to the ankle. All of these vessels showed marked narrowing of the lumen with evidences of complete occlusion in some as a result of fibrosis and thrombi. The histological examination of these vessels showed changes characteristic of Buerger's disease. The mesenteric and coronary vessels had similar changes which indicated the generalized nature of this disease.

THERE are a few important points with regard to this case:

This patient had a long history of intermittent claudication (11 years). This, of course, is significant, but after all, intermittent claudication is a symptom which depends upon an impaired nutrition of the tissues, and is not diagnostic of Buerger's disease, as will be shown by the next case.

There was also a history of a surgical procedure on the patient's left foot following which gangrene of the toes developed, as well as edema of the foot. It has been pointed out by Barker[1] in an analysis of 171 patients with Buerger's disease that gangrene had been precipitated by some mild surgical procedure in 35%, and by mild trauma in 10%. This is very significant, for, as in this case, it indicates the danger of surgical procedures to the extremities in the presence of a markedly impaired circulation.

The pulse was not palpable in a number of the larger vessels, but this in itself is not diagnostic, for, as pointed out by Morrison[2] from the examination of the pedal pulses of 1,000 patients with no symptoms referable to the peripheral vascular system, one or more of the pedal vessels were not palpable in 19.1% of the cases. In 31 cadavers, the dorsalis pedis was anomalous in seven cases.

The postmortem examination not only confirmed the clinical findings with regard to the impaired peripheral circulation and diagnosis, but also indicated the generalized nature of this disease by showing its presence in the mesenteric and coronary vessels. In this connection, it is interesting to point out that Taube[3] collected 26 cases of Buerger's in which thrombosis occurred in vessels other than those of the extremities, of which 12 were in the coronary vessels.

From the postmortem examination of this case, one can readily understand the futility of a sympathectomy in this patient with so much organic change in the peripheral vessels.

THE next patient on whom I wish to report is very interesting because of the striking contrast to the first case.

W. L. L., white male, aged 45, was sent to me on May 18, 1935, by Dr. Pulver, with the history that he was well until November, 1933, when he developed pain in the back following some light lifting while at the Century of Progress. This pain was followed by numbness in the leg. He then took 12 osteopathic treatments which gave him no relief. He then went to a large clinic, where a search for foci of infection was made but none were found. While there, he was diagnosed Buerger's disease. He was given diathermy treatments over his legs with no improvement. He was then given 24 "Pavex" treatments with no improvement. He was referred to a neurologist who called his condition a pseudo Buerger's disease and gave him 20 injections of sodium thiosulphate, after which he felt himself getting weaker and the dose of sodium thiosulphate was doubled. He received 20 injections of the double dose of sodium thiosulphate.

His complaints on coming to me were severe pains in the calves of his legs after walking about half a block, or after standing in one place for a short time, such as during shaving. This pain was relieved by a short rest, after which he could walk another short distance.

EXAMINATION: The physical examination was essentially negative except for a mild secondary anemia. The x-ray report of the lumbosacral spine as given by Dr. Jenkinson, of St. Luke's Hospital, is as follows:

"The transverse processes of the last lumbar vertebrae are wide and on certain motions may impinge on the ilium. The angle formed by the top of the sacrum and the last lumbar is somewhat acute. I get the impression that there is some impingement of the top of the sacrum on the posterior inferior articular surface of the last lumbar vertebra. There is some thickening involving the posterior arches of the lower lumbar vertebrae, especially the fifth, which may be due to an arthritis. There is some thickening involving the sacroiliac joints on both sides, nothing unusual, however."

The peripheral vessels were all palpable, and the peripheral vascular studies were within normal limits.

The anemia was treated with liver and iron, and with the improved blood condition the patient can now walk over a mile and a half without pain.

The results of the study of this patient stand out in striking contrast to the first case:

This patient gave symptoms of intermittent claudication which were as severe as those of the first patient, but the cause of these symptoms was different. The secondary anemia was an important factor in the impaired nutrition of the tissues.

It is very unwise to make a diagnosis of Buerger's disease unless absolutely certain, as these patients go from clinic to clinic and doctor to doctor for relief. The diagnosis of Buerger's disease is very difficult in some cases and may be virtually impossible; and under those circumstances a thorough search should be made for other causes of impaired nutrition of the tissues which may bring on the symptoms of intermittent claudication or painful feet.

IN SUMMARY, reports on two patients have been presented, both of which had the common symptoms of intermittent claudication, but presented a striking contrast with regard to diagnosis and course.

The first patient had a true Buerger's disease which was confirmed at postmortem. The second patient in all probability did not have Buerger's disease, and improved markedly following the care of a secondary anemia.

The extreme danger of mild trauma or minor surgical procedure in the presence of impaired peripheral circulation was stressed as a precipitating factor for the onset of gangrene, such as was well illustrated by the first patient.

References:

1. Barker, N. W.: *J.A.M.A.*, Vol. 104, No. 24, p. 2147, June 15, 1935.
2. Morrison: *New England J. Med.*, February 23, 1933, p. 438.
3. Taube, Norman: *J.A.M.A.*, Vol. 96, No. 18, p. 1469, May 2, 1931.

Discussion:

FRANCIS MURPHY, M.D., Milwaukee: Dr. Johnson was kind enough to send me his paper several days ago and I had an opportunity to review his case reports and had an idea what he was going to say. He is to be congratulated on the development of this instrument for the determination or evidence of peripheral volumetric changes. It is this type of work, especially the development of instruments of precision, that has augmented effective treatment and diagnosis of peripheral vessel disease. However, we must not lose sight of the fact that actually the physical examination must be mostly relied upon.

Diseases of the peripheral vessels may be divided into the functional and the organic type. The functional types are more apt to occur in women. Raynaud's disease, characterized by vasoconstriction and vasomotor neurosis, tends to occur more in women, and Buerger's disease of the organic type, is seen more in men. Buerger's disease may be diagnosed as was shown in the paper, by careful history taking—the history of cold feet extending back over a period of years. General sensation of cold, sensation of pain, intermittent claudication, color changes are the early features. We make diagnosis of this disease by observation, by inspection, and the color changes are foremost. The foot becomes red when allowed to hang down. On elevation it becomes pallid, white, dead-like. The pain may be constant, but usually it is there on exercise only, and finally necrotic areas occur at the tips of the toes. This disease is prone to occur in young men, 30 to 50 years of age, usually smokers, and I know, as Dr. Johnson said, it occurs in Polish Jews, but I have seen it in English, Irish and Swedish patients. But smoking does tend to aggravate it and I believe may have something to do with its development.

I should like to point out one thing—do not jump to the conclusion that a painful foot is always due to peripheral vessel obstruction. It may not be. It may be only a manifestation of the blood. Some blood disease as polycythemia vera may produce such symptoms.

I should like to call attention to the photograph of the foot with true Buerger's disease. What was there about that foot that would help differentiate the condition from arteriosclerosis? In Buerger's it is painful, red and swollen. In arteriosclerosis, which occurs in older people the foot is apt to be shiny, thin, pale and dry. In Buerger's the puffiness, redness, pain, is caused by the fact that thromboangiitis obliterans is a disease of the veins as well as of the arteries. It may occur years before there are symptoms. Therefore there is difficulty not only in blood getting into the toes, but faulty emptying, and this gives the puffy appearance to the foot.

We may divide treatment into medical treatment and surgical treatment. I believe medical treatment is more important. Most cases of Buerger's can be controlled medically. In contrast to arteriosclerosis, when necrotic lesions occur they may be self-limited. One must not be in a hurry to amputate a toe or a leg. To do so would be a mistake because this disease develops slowly and runs a slow, long, chronic course, finally, the inflammatory lesion may subside with the loss of only a toe or part of a toe. Frequently pain is a symptom that requires careful treatment. At times patients may demand operation for relief of pain. The control of pain should be carried out with simple measures as with bromides, luminal, amytal and such sedatives. Morphine shouldn't be used, for there is always the likelihood of causing addictions. The pain also may be controlled at times by intravenous injections of 5% sodium chloride given in doses of 200 cc. each, every second day. The foot must be kept at rest and external heat is an aid in treatment.

Sometimes we physicians are too quick to take up some new method of treatment when the older measures serve the purpose just as well. On the introduction of Pavex many thought a sure cure for vascular diseases of the extremities had been discovered. Experience has taught us otherwise.

Operative or surgical treatment of these diseases should be attempted only after very thorough medical treatment has failed to accomplish a cure. On the development of sepsis and gangrene of the foot amputation may be imperative in order to save the patient's life. Amputation of the leg should not be done when merely amputation of the toe is all that is necessary.

In conclusion, I should like to emphasize that the main points in the treatment are: (a) absolute rest without even stepping on the foot; (b) the medical measures as outlined in the doctor's paper; (c) the use of special aids when such seems necessary; (d) surgical removal of parts when gangrene has developed, and amputation when necessary to save the life of the patient.

Finally, the watchword in the treatment of all surgical diseases is patience, which frequently we physicians are prone to overlook.

Fractures

—*Their Conservative Treatment by Adhering to Fundamental Principles*—

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Des Moines, Iowa

THE treatment of fractures will always be of great interest and a subject of controversy in our profession.* Each fracture is a law unto itself, even though there are certain fundamental principles to be observed in all cases. The chief reason for this controversy is the fact that we have been so interested in thinking of various splints, wires, and methods of open reduction, that we have forgotten the anatomy surrounding the fracture, and have failed to adhere to the fundamental principles in its treatment.

The treatment and care of fractures are of interest, both from a surgical and an economic standpoint. If the treatment of a fracture has not obtained the maximum amount of salvage from a human standpoint, it has not been satisfactory from an economic one. Good surgical results mean good economic results.

The so-called "Iron Age of Industry" has brought into existence new types of severe crushing injuries, resulting in increases in both economic and medical costs to industry. This has challenged us to procure better end results, to reduce not only the economic loss of time, but also to alleviate needless suffering, and to lessen deformity and loss of limb.

Practically 75% of all fractures and injuries are first seen by the family physician, and he is not always prepared or competent to care for this type of case. However, there is no reason why every physician should not be conversant with the fundamental principles in the treatment of fractures, or at least be able to give proper first aid until the case can be placed in the hands of a competent surgeon. Not only should physicians be more familiar with these fundamental principles, but medical schools and attending staffs of hospitals should also take a more active interest in teaching this phase of medicine. It is more important for a student to be familiar with the proper care of fractures than it is for him to know the various steps of gastro-enterostomy.

Treatment of fractures has ranged from the

* Presented before the Congress of Railway Surgeons: Meeting of the Association of Surgeons of the Chicago & North Western Railway, and the Burlington Surgeons, Chicago, November 6, 1936.

extremely conservative to the extremely radical. A few years ago practically everyone was carried away by the radical treatment, using bone plates, ivory pegs, bone transplants, and every sensational device known for the rehabilitation or salvaging of recently fractured limbs. But it was soon recognized that cases treated along more conservative lines resulted in a higher percentage of good, useful limbs.

Open reduction of fractures as against closed methods will always be a subject of controversy; but regardless of what procedure is chosen, the fact remains that we are dealing with a human as well as an economic problem. Open reduction, in the average surgeon's hands, is dangerous. Whatever may be said about asepsis, improved technique and new instruments, the number of infections following open reduction of simple fractures, with subsequent osteomylitis, deformity, loss of time and money, to say nothing of the suffering of the patient, should cause any surgeon to employ every means at his command to obtain proper alignment with non-operative methods. No doubt open operations will always be necessary in selected cases, but not before every conservative device has been tried, using the minor operative procedures, such as Steinmann nails, Kirschner wires, etc., before resorting to radical open reduction.

WHAT do we mean, in treatment of fractures, by adhering to fundamental principles? Simply this, that every fracture should be reduced by traction and counter-traction. After reduction the fragments must be kept continously in the proper position until firm union takes place. Fragments are displaced by a continuation of the force which produced the fracture, by the contraction of the muscles, and by the weight of the part.

For example, in reducing a Colles' or Pott's fracture the mechanism by which the fracture is produced and the application of the lines of force must be understood, for in the reduction, the mechanism should be reversed or retraced and the fragments dressed in the reverse position.

Supracondylar fractures of the humerus in the majority of cases are caused by a fall on the extended forearm; that is a fracture by extension. In such fractures the arm should be dressed in flexion, for the line of fracture is just above the attachment of the joint capsule on the anterior surface, upward and backward, with the line of fracture running to the external surface, inward and upward. Even though the triceps may help to splint the fragments by dressing fractures of this character in acute flexion, the chief reason for using this position is that the mechanism of the fracture has been reversed, bringing the fractured ends into apposition.

On the other hand, about 5% of the supracondylar fractures of the humerus are fractures by flexion, in which the line of fracture is low posteriorly and runs downward and forward. In this type, the lower end of the upper fragment is displaced posteriorly, and if dressed in acute flexion the deformity would be increased. Such a fracture should be placed in extension, the reverse position of the usual fracture.

The effect of muscle pull in the displacement of bone fragments should be understood and is well illustrated in fractures of the surgical neck of the humerus, in fractures of the radius or both bones of the forearm between the attachment of the supinator longus and the pronator radii teres, and in fractures of the femur below the lesser trochanter. In all of these fractures the long fragment which can be controlled must be dressed in line with the short fragment which cannot be controlled.

In fractures of the humerus the long fragment should be dressed in abduction and external rotation.

In fractures of the radius or both bones of the forearm occurring between the supinator longus and the pronator radii teres, the forearm should be flexed to relieve the pull of the biceps and the hand fully supinated. The lower fragment which can be controlled will be pronated by the pronator radii teres and must, therefore, be brought into line with the supinated, uncontrollable fragment.

In fractures of the femur below the lesser trochanter, the long lower controllable fragment must be dressed in line with the short, upper uncontrollable fragment, which will be flexed, abducted and rotated outward. The lower fragment must be placed in the same position, traction and counter-traction being employed.

ONE common cause of prolonged disability in fractures is due to failure to remember that joints become stiff through disuse. As soon as callous is sufficiently formed to safely maintain the position of the fragments, motion of the joints should be instituted and should be continued until the patient has entirely recovered, doing the so-called "physiotherapy" during the course of convalescence and not afterward.

There is no doubt that physiotherapy is an important factor in the treatment of certain types of injuries, but it is often used as a cloak to cover poor work. As an illustration, we often see fractures of the wrist treated with the application of board splints extending to the finger tips, with the entire hand bound down and allowed to become stiff and practically useless. Such treatment requires massage, baking and other physiotherapeutic measures to undo the damage that was thoughtlessly or carelessly done by improper splinting. If a fracture has not been properly reduced, all the physiotherapy on earth will not lessen the resulting deformity.

Good functional results can only be obtained by good alignment of the fractured ends, even though their apposition may be poor. However, anatomical alignment results in more rapid healing, less disability and better function than a makeshift "just as good" position.

It is known that in many instances anatomical re-position cannot be obtained, but the ideal should be to replace the parts as nearly as possible in their original position.

Fractures are emergencies of the first order, and their proper reduction and care should be classified as major operations. Proper care should be given immediately, for the first treatment is the crux of the entire situation. By treating the fracture early, you treat the fracture; by treating the fracture late, you treat the complications. Criticism has been just in many cases where prolonged disability and hopeless crippling have been due to ignorance, incompetency and indifference. Therefore, these fundamental prin-

ciples are more important and indispensable in the treatment of fractures than are splints, and they are often forgotten or neglected. Too much attention is given to treating each fracture in a unique manner, or according to a new plan, forgetting that the same rules apply to all fractures in a greater or lesser degree.

Discussion:

H. W. ORR, M.D., Lincoln, Nebraska: The most I can do is to emphasize some of the points Dr. Martin has made so well in his paper. I should like to agree that first aid treatment of these cases calls for immobilization and not much else. If the first aid is limited to immobilization, in the best position possible, without manipulation that is all that should be done. When the patient comes to the operating room, three fundamentals should be kept in mind, and here again it is important to avoid traction that cannot be maintained. This is just as important in the operating room as at the scene of action. Many times traction is made which is lost before the splint is applied or soon afterwards.

The first fundamental is to obtain on the operating table, full length which must be maintained throughout the operative procedure. Then the limb must be successfully splinted by casts, etc. Too often the anatomical landmarks are disregarded and one arrives at the bedside of the patient, even soon after operation, when length has been maintained but with a certain angular deviation that will change the end result or rotation of the fragments of the fracture. It is quite common that you see patients in bed following reduction in the operating room with the knee or foot internally or externally rotated and disability will occur, in spite of the fact that position and length were good at the time of reduction.

Now as to the requirements for the reduction and control of fracture fragments. With the use of the Thomas splint for treatment of leg fractures, good results are obtained, but the hammocks are designed to facilitate the change of dressings. You may have had the experience of having had control of the fracture and then having it entirely lost through the loosening of these hammocks during changes of dressings. Also, because of frequent dressings, the limb is moved and the sepsis is aggravated and we have a sick patient for weeks or months. We have substituted for that an apparatus whereby the limb is perfectly controlled as to length and position. I do not like the Kirschner wire so well, because it is more difficult to control and more difficult to use with plaster. When I was with Dr. Böhler in Vienna I was impressed not so much by his special traction apparatus or his non-padded cast but by the fact that he could put the patient on the table for operative reduction, and that the patient did not leave the table until the fracture was reduced.

It is my custom in all cases difficult to control to use a double leg cast with a cross bar so that there is no anxiety about complete control of the patient.

I want to thank the members for this opportunity, and to thank Dr. Martin for advocating conservative treatment in these cases, of which I most heartily approve.

WILLIS CAMPBELL, M.D., Memphis, Tennessee: Dr. Martin has very ably discussed the mechanical principles in the treatment of fractures, but we must realize that there are certain physiological principles which are just as important if we wish to obtain the maximum number of excellent results.

In order to secure union in any fracture there are three factors of bone growth and repair which must be recognized. They may be enumerated as follows:

1. The blood clot between the fragments produces an area of stasis or aseptic necrosis, which is conducive to the normal infiltration of calcium as observed in the calcification of any tissue in the body in which there is necrosis. This area presents the proper medium for the evolution of the delicate process of repair.
2. An active blood supply must surround the area of stasis or blood clot to promote repair.
3. The presence of free calcium in the local area is a source of supply which enhances callus formation.

We must remember that a fracture is not merely a break in the continuity of bone but is an injured extremity. Hence trauma to all component parts must be duly regarded. In fractures union will be delayed, prevented, or impaired in quality unless the three fundamental factors of repair mentioned above can be maintained. Excessive force in repeated attempts to reduce a fracture may disseminate the blood clot and at the same time detach the surrounding soft tissue from which the blood supply is derived. Also excessive traction may act in the same manner, causing delayed union or non-union. Union is, for this reason, delayed in compound fractures and also to some extent when open methods are employed, regardless of how carefully the circulation may be considered.

There are many other physiological principles involved, such as approximation of fragments, osteogenesis, osteoclasis, atrophy, location, age, etc., but time will not permit consideration of these.

A large percentage of fractures of the shaft of the femur can be reduced by manipulation. In order to prevent displacement after the cast has been applied, a Kirschner wire may be inserted through the lower end of the femur and incorporated in the cast. Should angulation or displacement occur, skeletal traction can then be applied.

There is no rule of thumb in treating fractures as each is a separate clinical problem. Procedures in the treatment of fractures are too frequently applied as a carpenter, cabinet maker or sculptor would approach a mechanical problem. Whereas, equally or more important than the mechanical aspect is the practical application of the physiological principles enumerated, if a maximum degree of success is to be attained.

Gas Gangrene

— *Early Recognition and Effective Treatment* —

ARTHUR M. DICKINSON, M.D., F.A.C.S.,
and
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THE importance of gas gangrene to the industrial surgeon and to the general surgeon as well is increasing, so it seems worth while to review our present knowledge of it, particularly as regards early diagnosis and adequate treatment. The general aspects of the subject were reviewed by us in a previous article[1] in which we urged the value of serum treatment. Whether or not the actual incidence of the infection is increasing is a moot question, but it is certain that the diagnosis is being made more frequently than it was a decade ago; yet the diagnosis is often made too late to permit effective treatment.

Of the anaerobes which, either alone or in various combinations, cause gas gangrene, the most important are the following:

(A) Bacillus Welchii (synonyms: Bacillus perfringens and Bacillus aerogenes capsulatus).

(B) Vibrion septique of Pasteur (synonym: Bacillus of malignant edema).

(C) Bacillus oedematiens (synonyms: Bacillus novyi and Bacillus bellonensis).

Of lesser importance and of doubtful pathogenicity for man are Bacillus fallax, Bacillus sporogenes, and Bacillus histolyticus. The Welch bacillus (Bacillus perfringens) is the one most regularly found, but mixed infections are common, hence the need for a polyvalent serum.

The details of the pathological process have been well described by Davis and Hanelin[2] in a recent issue of this journal (May, 1936), and they need not be repeated now; however a point of great practical importance to remember is that gas infection may complicate any lacerated wound, particularly if it is contaminated by soil, excreta, or woolen products; and it has been known to occur following hypodermic injection, or ruptured appendix[3], or criminal abortion. The highest incidence of gas gangrene in civil life is associated

with compound fractures in which there are regularly found injury to muscle tissue and more or less interference with blood supply, factors which favor the spread of an anaerobic infection. In all such injuries tight dressings, and particularly plaster casts, should be avoided. Frequent inspection of the patient, the wound, and the chart, are of extreme importance during the early stages when the complicating infection may put in an appearance. Early recognition is the most important step in treatment and is by no means difficult if the possibility of gas gangrene is kept constantly in mind.

THE early signs and symptoms of gas gangrene, therefore, should be carefully considered. The clinical appearance often gives us our first warning when the patient remains toxic after recovery from the initial shock. An elevated pulse rate, higher than might be anticipated for the amount of fever, is another early sign. Pain is frequently severe at this stage and should lead us to search for the cause. Inspection of the wound and palpation of the surrounding tissues are next in order; inspection should be repeated at frequent intervals in suspected cases. The characteristic mousy odor may be noted before the dressings are removed and, of course, will be more pronounced when the wound is exposed. The skin near the wound often shows a peculiar bronzing before it turns black from necrosis. Gas bubbles may be seen escaping together with a dirty serous discharge, or the typical crackling sensation produced by gas in the tissues may be noted either by palpation or by auscultation of the part. An x-ray film may show evidence of gas deep in the tissues before it is otherwise apparent, so a roentgen examination should be made and repeated if there is any doubt as to the interpretation of the findings. A second examination in the infected case will show after a few hours further evidence of gas in the tissues. In most instances, however, clinical detection of the infection is possible before x-ray evidence is positive.

Smears and cultures should be made when gas gangrene is suspected, but one should not wait for the laboratory's complete report before starting treatment. A direct smear stained by Gram's method will frequently show the bacilli (Gram positive) in large numbers, and by special technic it may be possible to demonstrate the capsule of the Welch bacillus (Bacillus aerogenes capsulatus).

Special cultural methods will be necessary to distinguish between the different anaerobes, and no entirely satisfactory rapid method has as yet been devised. When the clinical diagnosis is substantiated by smears (and occasionally in the absence of such substantiation) appropriate treatment by debridement and injection of large amounts of polyvalent serum both intravenously and intramuscularly should be commenced immediately.

The infection, which spreads along muscle bundles and often invades the blood stream, is frequently a mixed one and must be treated vigorously. Debridement must be thoroughly done and followed up with injections of serum at intervals of six, eight, or 12 hours, depending on the condition of the patient, until the outcome is determined. Parenteral fluids, transfusions, and other supportive treatment may be indicated.

TREATMENT with polyvalent serum should supplement and not replace judicious surgery. This surgical treatment should be thorough debridement of the wound whether or not a debridement has been done previously, and all discolored and non-contractile muscle bundles should be excised. Necrotic tissue should all be removed and drains should be inserted. Amputation will not be necessary in the majority of cases unless the original trauma was, in itself, sufficient to warrant it. When amputation is done, it will be of the guillotine type in most instances, and should be done well above the infected area with proper precautions to guard against contamination of the stump.

Wet dressings should be used and applied loosely to avoid constricting the part. Dakin's solution has been frequently used, but potassium permanganate (1 to 500) has also been recommended as it is supposed to inhibit the growth of anaerobes. For a similar reason zinc peroxide has recently been advocated by Meleney[4] and should be used when a potent preparation can be obtained. In this connection, please note that many preparations are not potent, and Meleney advises certain tests of the material before it is used.

Treatment by means of repeated small doses of x-rays has been advised[5] and seems to offer definite promise.

The outlook in cases of gas gangrene is by no means discouraging and, with appropriate and adequate treatment, the mortality should be much lower than the frequently quoted 50%. The prophylactic injection of polyvalent serum seems to lower the incidence of the infection, and it should be given along with the usual dose of tetanus antitoxin in appropriate cases. Early recognition of gas gangrene will make possible the effective use of therapeutic doses of serum, and less mutilating operations will restore function earlier and more completely.

IN CONCLUSION, we wish to stress the following important points which seem essential for the lowering of morbidity and mortality rates in gas gangrene:

1. Prophylaxis by injection of serum at the time of the first dressing in all possibly infected cases.
2. Being constantly alert to the possibility of development of this type of infection in any wound.
3. Early recognition of the existence of this infection by means of frequent examination of suspected wounds. Depend upon abnormal tenderness, even slight crepitation or a few expressed gas bubbles and the characteristic odor.
4. Confirmation of the diagnosis by immediate smears and the finding of spore formers with the ordinary Gram stain.
5. Prompt treatment by serum, surgery and proper antiseptic solutions.

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Syphilis in Industry

— One of Its Major Health Problems —

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COINCIDENT with the national movement for the control of syphilis, it is urgent that American industry look anew upon this major health problem which it shares in large part. Industrial organization is destined to play a leading role in the campaign which will enlist various economic and social forces throughout the country. Therefore the sooner industry recognizes its responsibility in the program for the control of syphilis, the more prompt and efficient the final result will be. From the social and humanitarian, as well as from the purely economic point of view, it is of paramount importance that industry realize the seriousness of syphilis as an important factor in affecting its man-power.

The importance and prevalence of the disease stands clearly before our health organizations, social groups, church and state. The stage is set to put into play all the forces of modern medical science, which will eventually lead to the eradication of syphilis as a social scourge, or at least reduce its incidence to the relatively innocuous level in which diphtheria and typhoid are today. The nation-wide movement will combine the forces of state, health organizations, clinics and institutions, hospitals and social service, which will be coordinated and guided largely by the United States Public Health Service. It is thus only through concerted action and effort of all our social and religious, economic and industrial forces, that syphilis in America will be controlled.

Among the laity, syphilis as a preventable disease is receiving the attention it deserves in an ever-widening sphere. Unlike cancer, tuberculosis and other diseases to which mankind is heir, syphilis can be effectively controlled by the thorough application of the knowledge already possessed by medical science. Our useful knowledge of the disease began with Schaudinn's discovery of the Treponema Pallidum, the specific causative organism of the disease, in 1905. This was followed by the epochal work of Ehrlich and Hatta in the synthesis of the arsphenamins, and then the splendid contribution of Fournier, Levaditi and their co-workers, who pointed out the therapeutic effectiveness of bismuth. In the past two decades, scientific workers of all nations have concentrated their attention upon the pathogenesis and effective treatment of this disease, but the practical and general application of the knowledge thus gained through medical research is lagging far behind the scientific advance. From the results of investigations carried out in clinic and laboratory, culminating in America with the particularly thorough work of the United States Public Health Service, and by important cooperative groups, the best means and methods of controlling infectiousness have been codified. A sweeping application of the principles of detection and diagnosis of the syphilitic, his thorough and adequate treatment with the highly effective therapeutic agents we now possess, as well as competent follow-up of his contacts, will reduce syphilis to the relatively low incidence it holds in the Scandinavian countries today.

A high index of suspicion among physicians, both industrial and private, combined with frequent clinical examination and frequent blood testing, will lead to recognition of every case. By prompt treatment of the recently infected individual, transmission can be definitely limited or suppressed altogether. Proper therapeutic management of the expectant mother, will render the offspring non-syphilitic. By an adequate system of follow-up and social service, we can prevent the dissemination of the disease from its multiple points of origin. If all our forces were mobilized against the enemy, it is extremely probable that syphilis could be swept from the list of the chief killing disease within the course of one or two generations.

While American industry merits commendation in protecting the health and physical efficiency of its man-power, its responsibility with regard to syphilis is in definite need of revision and stimulation. The national program for syphilis control will undoubtedly spur the efforts of industrial health organizations throughout the country. The importance of the attack upon syphilis will be continually ringing in the ears of the public at large. The taboo and stigma heretofore attached to the very word itself is fast disappearing. The enemy is becoming known by his true colors. Syphilis will no longer be unmentionable. Each day, it receives a renewed attack through the lay press, the radio, and through pamphleteering of social organizations. Therefore, it is for industry to take cognizance of the importance and prevalence of the disease in any health program which it sponsors and supports.

In order to bring industry face to face with this problem and emphasize again its grave responsibility in controlling this disease, let us examine some of the risks and losses in industry which may be attributed directly or indirectly to syphilis. After a consideration of these important problems in the industrial family, we shall devote our attention to a practical and workable plan for industrial organizations to cooperate in the control of syphilis.

FIRST of all, let us see what industry risks in neglecting the treatment of syphilis among its employees. Contrary to the many diseases which strike with dramatic suddenness, syphilis does not maim or kill with the swiftness of a flood or tornado. The disease masquerades under a robe of many patterns, and has been named by William Osler as the "Great Imitator." After the early signs upon the skin and in the natural body cavities are lost to view, the course of the disease is characterized by a more or less prolonged period of latency during which it escapes detection except usually by blood tests. Throughout its insidious course, the important organs of the body, chiefly the cardiovascular and central nervous system, are in constant danger of being involved in the syphilitic process, so that serious impairment of function is the eventual result. In its later stages, the disease may imitate any condition or assume any form in the entire gamut of human pathology. Syphilis lurks in the back-

ground of mortality and morbidity statistics in such a way as to be constantly concealed from the human eye. It is for this reason that the disease constitutes one of the heaviest burdens of our economic life. Studies of large numbers of cases indicate that the peak incidence of contagion occurs in the 24-year age group. From 20 to 40 years of age, that is, the most active and productive phases of adult life, we find over 70% of all cases in both sexes. The wage earners of industry, in the third and fourth decades of their lives, are the very ones who are most likely to have syphilis, and this serves to emphasize further the importance of syphilis in our industrial life.

INDIVIDUALS who have recently contracted syphilis are usually in a state of peculiar psychic and emotional reactivity. The emotional depression and anxiety may be justifiably regarded as the first loss to industry. In the early stages of his infection, the syphilitic employee is at best an indifferent and anxious worker. He is under a mental and moral strain brought on by his knowledge of having acquired a loathsome and dreaded disease. He reflects upon the seriousness of his condition; he ponders the outlook for a possible cure; he knows that the safety of his family is jeopardized, and he wonders how the expense of treatment can be met. Industry thus loses by virtue of mental anxiety and worry of the early syphilitic.

The syphilitic worker in the infectious stage is a constant menace to the safety of his fellow workers and companions. He is the focal point from which the infection may be transmitted to others, either directly or through accidental means. It has been recently shown by Scheuer, in his report of "occupationally infected syphilitics together with the mode by which the virus was transmitted," that accidental transfer of the syphilitic virus among group workers is fairly common. Investigation of this kind has shed much light upon the constant hazards which the presence of one syphilitic maintains in a group of wage earners.

One readily understands for example how spirochetes may be transferred upon the mucous membrane of the mouth among musicians or among glass blowers. In the same way, indirect transmission may occur by contact with objects and instruments which workers hold between their lips, such as needles, pins, awls, brush handles, wire and thread. Viable treponema have actually been demonstrated up on the rim of a drinking glass one-half hour after being used by a syphilitic with mucous patches in the mouth. Thus the ever-present danger of dissemination of the disease among innocent fellow workers may properly be regarded as a second risk to industry.

The necessity of isolation of the infectious case therefore becomes quite apparent. The early syphilitic should be excluded from work until he has been rendered non-infectious through adequate treatment. Like the public health officer, the industrial physician is first and foremost the defender of those who still enjoy health. His duty is to keep intact the physical fitness of every component part of the industrial machine.

One of the physician's chief problems in the management of early syphilis is the strong tendency on the part of the patient to lapse treatment. There are many reasons for irregularity in reporting to the health officer for treatment, but the principal one is perhaps the natural inclination of the uninitiated to minimize the seriousness of the disease as soon as visible lesions begin to disappear. Promptly after the administration of the first few injections or arsphenamine, all cutaneous and mucosal lesions disappear before the very eye, and there is immediate improvement in the patient's morale. If the early syphilitic misses treatment at this stage of the disease, infectious relapse becomes a strong possibility. In such cases, there is a recurrence of highly infectious lesions upon the skin and mucous membranes. Believing that he has been cured, the individual is likely to exercise less care in exposing others.

In its more or less long period of latency during which there are no outward or visible manifestations of the disease, syphilis is frequently a complicating factor in intercurrent disease, or following physical injury. It often prolongs convalescence from even minor injuries. The partial disability subsequent to such injuries or illnesses sustained by the syphilitic employee is likely to be attributed by him to the recent or immediate injury which he has experienced. In all such cases, it is important to devote special attention to a possible underlying syphilis. An interesting series of cases studied and reported by Page Edmunds well illustrates the importance and necessity of such alertness. In 35 cases where the diagnosis included such conditions as influenza, hemiplegia, sacro-iliac disease and a host of other conditions, a final diagnosis of syphilis was confirmed. All of these subjects lost a total of 13,946 days, at a total cost to industry of $50,711. Thus, from the economic viewpoint alone, industry would profit enormously by the prompt and early detection of syphilis among its industrial workers. In a large proportion of cases, the industrial physician is forced to depend upon the routine taking of blood tests in order to ferret out the syphilitics among employees. Early syphilis which manifests itself by visible lesions, and late syphilis which is causing symptoms from functional incapacities of damaged organs, are both comparatively easy of detection. During the prolonged latent phase, however, when the disease has become quiescent and there are no clinically detectable signs, the individual's syphilitic status can be proved only by blood examination, the Wassermann reaction and its variations, and the flocculation tests. The repetition of blood tests must be emphasized; one should never lose sight of the fallibility of serologic reactions, and it is only through a combination of physical examination and laboratory tests that a final diagnosis of syphilis should be made. Altogether too many cases of syphilis slip by during routine examinations by our industrial health officers, not to mention the cases overlooked in hospitals, clinics and other units handling large numbers of cases, but which fail to carry out routine blood tests. Any illness in an industrial worker, or any convalescence prolonged beyond the usual expectancy following an injury or an illness, should be the occasion for repetition of blood testing.

The facility with which such investigations can be carried out in a large industrial organization has recently been shown in the excellent report of Gehrmann in the Dupont industry, where over 36,000 persons are employed. Only 10% of the old

employees refused the blood examination, while every new employee has been examined serologically during approximately the past two years. In those employees found to have syphilis (about 4%), adequate treatment is demanded by the company. No one in whom a diagnosis of syphilis has been established is refused employment if he is willing to take treatment, but all contagious cases are naturally excluded from work until all danger of infectiousness is removed. Exception is likewise made among food handlers, food-product handlers and wrappers, as well as those patients with evidence of neurosyphilis and workers exposed to lead. All cases showing a positive blood serologic reaction are subjected to complete physical examination, including x-ray of the chest. Likewise, every proved case receives complete instruction regarding the disease and is impressed with the importance of medical examination of all contacts. The author believes that industry should assume the entire responsibility for the treatment of such cases among its employees, and should insure their proper and continuous treatment. The effectiveness of such a health program and the benefit to be derived by the company as well as by industrial workers as a group will soon reveal their true importance among companies whose industrial physicians emphasize the search for and the adequate treatment of every case of syphilis. The employee with early syphilis must be removed from the working environment of others whom he is likely to infect. Syphilis thus becomes justifiable grounds for rejection when there is any danger whatever of exposing fellow workers to the contagion. Resumption of work should be permitted only after it is certain that the early case has been rendered completely non-infectious.

HAVING considered the imminent risks and losses engendered by early syphilis in industry, let us now turn our attention to the late manifestations of the disease. Here we find that syphilis creates still more havoc among the ranks of workers in industry. The visceral complications of late syphilis, which are predominantly those of the cardiovascular and central nervous systems, form a very large percentage of industry's disabled and incapacitated workers. In these individuals the damage caused to important parenchymatous structures as, for example, the eye, the liver, the heart or the spinal cord and brain, does not usually become clinically apparent until years after the initial infection. Syphilis which has gone unrecognized through failure to carry out adequate clinical examination and blood tests, exacts a heavy financial toll from industry. These effects are felt through labor turnover and production. Industry likewise sustains the high cost of prolonged medical care. It has to meet the cost of expensive compensation cases and of damaged property, not even to mention the loss of valuable workers who lose their lives through neglect or inattention of a paretic fellow worker.

It has variously been estimated that syphilis accounts for approximately 10 to 12% of all cases of organic heart disease. Remembering that heart disease is responsible for perhaps a greater number of deaths than even pneumonia, tuberculosis or cancer, we can readily grasp the immense importance of syphilis as it affects the cardiovascular system. Our vital statistics have not been able to reveal these facts. It has been so far impossible for our vital statistics to give a real picture of the prevalence of syphilis, particularly its incidence in underlying organic heart disease. In valvular heart disease, angina pectoris, aneurysm and arteriosclerosis, apoplexy or any one of the many conditions affecting the cardiovascular system, syphilis is often the fundamental cause. It has been repeatedly pointed out that heavy physical labor is conducive to the development of valvular heart disease, aortic dilatation and aneurysm among syphilitic employees. The chief localizations of the syphilitic process in those engaged in heavy physical work are in the proximal portions of the aorta. The degenerative changes taking place in the aortic wall eventually lead to scarring and replacement of the normal elastic tissue by fibrous tissue which is inadequate for normal function. Under the stress of increased cardiac activity, commensurate with the degree of physical exertion over a long period of time, the weakened aorta begins to dilate, and the eventual result is a functional incompetence of this structure as well as of the heart which brings about such conditions as aortic dilatation, regurgitation or actual aneurysm. Such complications inevitably lead to the worker's inability to carry on his usual occupation, particularly if this involves prolonged and heavy physical exertion. Every syphilitic thus engaged runs the risk of partial or complete disability and thus becomes the financial charge of the company which employed his services. An excellent illustration of the frequency of cardiovascular complications among syphilitics engaged in heavy physical work is found among the Negro stevedores of the New Orleans docks. The common occurrence of syphilis and the high incidence of aortic dilatation, regurgitation and aneurysm run hand in hand, as has been pointed out by Matas. Such examples could be multiplied many times by an investigation of the mining industry, construction work or any other branch of our industry in which various types of heavy labor are demanded.

The central nervous system is likewise predominantly affected by syphilis. For example, more than 10% of all commitments to the state hospitals for the insane are the direct consequence of general paresis, which alone is caused by a syphilitic infection. Involvement of the central nervous system may remain asymptomatic for a long period of time, revealing itself by no outward sign, nor by any alteration in the mental capacities or reactions of the patient. In this phase it can often be diagnosed only by examination of the spinal fluid; quite suddenly, through the provocative influence of a cranial injury, or as the consequence of some severe emotional or mental strain, a whole chain of events leading eventually to an obvious paretic status may be set in motion. Conversely, the disease may produce symptoms at a very early stage, manifesting itself by the appearance of a tremor about the lip or an alteration in conduct. The early paretic lives about us and is a constant source of danger to his fellow man. He is to be found in the mine, at the loom, or at the controls of factory machines. Paretics operate moving vehicles upon our city streets; they are at the controls of auto buses, street cars and locomotives, they drive cars at high speed upon the state highways and thus

constantly place in jeopardy the lives of others. These individuals lose their mental alertness very early; they are moody and impulsive, and often become subject to fits of anger and other emotional outbreaks. One of the earliest manifestations consists of a defective memory both for recent and past events; important matters are overlooked, and the subject may become disoriented among quite familiar surroundings. The early paretic fails to react to normal stimuli which directs his safety, and in a moment when his mental alertness fails him, he may overlook a danger signal and thus become responsible for a serious accident. In fact, all the mental faculties — the judgment, attention and discrimination, may become so involved that it becomes difficult, if not impossible, for the subject to carry out or execute the normal pursuits of life. Gross and inexcusable errors are committed and the patient's daily conduct may become profoundly altered. It is quite obvious that an employee exhibiting such derangement of his mental faculties is a grave risk in industry, and during the more or less long period when his unfortunate condition is unrecognized, his daily conduct constitutes a menace to everyone in his immediate surroundings.

When late syphilis affects the nerve centers and pathways of the spinal cord, as it so often does when tabes dorsalis becomes the neural complication, we observe faulty coordination and mistakes in muscular action resulting in falls and other accidents for which claims are paid on other grounds than for syphilis. There is no doubt that the ataxial syphilitic constitutes a very definite proportion of these accidents in industry. Thus, the risks and losses occasioned by syphilis among the ranks of industrial workers could be multiplied many times.

It is a certainty, therefore, that American industrial efficiency would greatly benefit by extending health service to include syphilis in any public health program within the industrial family.

The great importance of concentrating upon the diagnosis and treatment of syphilis has already been recognized by several large industries which have included the treatment of syphilis in the benefits offered by their medical provision arrangements. In this respect, however, American industry has failed to keep pace with the health work in Europe, where industry provides for the almost universal medical care of syphilis, by some means or other, among its employees. Millions of American industrial workers and their families would be aided by the general application and acceptance of such a scheme of medical care for syphilis, which in turn would inevitably exert a profound influence upon the prevalence of syphilis in our economic life.

ONCE such a program is adopted, the control of syphilis in industrial families would rapidly become simple and effective. Only a few important directives are necessary to guide health organizations in this work. These are: (1) complete physical examination, together with blood testing of each new employee; (2) physical and serologic examination of those already employed; (3) the insistence upon treatment of all cases found to have syphilis; (4) general application of preventive measures among the workers; (5) inclusion of the treatment of syphilis among the benefits derived through health and medical provision arrangements; (6) dissemination of knowledge concerning the disease and suitable popular instruction of employees regarding syphilis.

Every new employee should have a clinical and serologic examination for evidence of syphilis. At the same time, all those previously employed should be urged to submit to a blood examination, and by persuasion and instruction, rather than coercion, should be urged to undergo thorough examination for the appraisal of their syphilitic status. It is, of course, important to follow up the investigation among members of a family and the various contacts of those individuals found to have the disease. A complete line of investigation can thus be carried out when the serious import of the disease has been made known to the infected individual by the industrial physician.

When any re-examination is deemed advisable, for example, at the time of some intercurrent illness or following some injury, the Wasserman reaction or its variations should form an essential part of the procedure. It is almost a matter of daily experience that the routine performance of blood tests whether there is any clinical evidence of syphilis or not, will often pick up many cases of the disease which otherwise would be missed.

All cases of early syphilis fall into a special category, the safeguarding of the victim's fellow workers being the chief consideration of the industrial physician. Such cases should be allowed to resume work only after they are rendered noninfectious through intensive treatment, according to standard procedures in such cases.

The responsibility of accepting employees who have syphilis rests squarely upon the shoulders of the industrial physician. Naturally, the most important consideration will always be the possible dangers to which innocent fellow workers are exposed. Cases of early syphilis which have received six to 12 injections of arsphenamine, and who are conscientiously following their treatment schedule, should not be refused. The same general scheme would apply to latent, asymptomatic cases who are competent to perform their jobs. Those individuals with late syphilis must be judged with discrimination, and with consideration of the particular case. If such an employee is physically and mentally able to assume the responsibility of a position, he should not be rejected because he has syphilis. In such an instance, quite naturally, the medical knowledge of the industrial physician again controls the situation. Cardiovascular involvement precludes the ability of a wage earner to perform heavy physical labor, just as a man with clinical evidence of neurosyphilis should not be placed in a position of responsibility, particularly if this involves the safety of others, or the manipulation of delicate machinery.

Lastly, it should be strongly urged that the treatment of syphilis should be included in the benefits from the particular health insurance scheme which is maintained by the industrial organization.

Such a program of preventive medicine in industrial health safeguarding would pay for itself within a short time. Since official health organizations began to deal with this disease, there has never been a more propitious moment than the present to control it effectively.

Pre-Existing Syphilis

—*As an Intervening Cause in Workmen's Compensation Cases*—

I. H. RUBENSTEIN,
of the Chicago Bar

THE scope of this article[1] is limited to those cases only which involve syphilitic workmen, who are injured in the course of their employment, and whose rights, or the rights of their dependents, as to compensation for disability or death are fixed by Workmen's Compensation Acts. In all of these cases, the question to be determined is what effect the pre-existing syphilis of the injured workman has as to liability or to the amount of compensation to be awarded for disability or death. The significance of this question is made apparent by the estimate of Surgeon General Cummings of the United States Government "that there are over 643,000 persons under treatment for this disease in the United States at all times, and that approximately 423,000 new cases come under medical supervision annually."[2] These enormous figures do not account for many additional thousands, who never resort to medical treatment, but rely on patent drugs, Christian Science, and other forms of quasi-medical treatment as a cure for this dread disease.

Aside from its frequency, pre-existing syphilis presents a serious problem in workmen's compensation cases. Its ravages and destructive effects on the human body and mind are appalling. It retards recovery from injury by delaying the healing of wounds and the union of fractures, thus prolonging the period of disability. In its advanced stages, it often causes paralysis, insanity, blindness and other forms of disability, and many times even death. As a consequence, this disease has compelled employers and insurance carriers to set aside much larger cash reserves than ordinarily necessary for the payment of compensation claims. Because of these factors, a knowledge of the law on these types of cases is highly important not only to the lawyer, but also to the doctor[3], the employer and the insurance carrier.

To begin with, it may be stated as a general rule that "compensation may be awarded for an injury although there is a pre-existing syphilis, if this disease is aggravated and accelerated by such injury, but an award cannot be sustained where the evidence shows that the disability would have arisen regardless of the injury."[4] In other words, the law is that where the pre-existing disease of syphilis is the lone, sole and only cause of the disability or death of the injured workman, then there is no liability for compensation. However, where the injury directly aggravates and accelerates the pre-existing syphilis, and the injury materially contributes to speed the progress of this disease to its culmination in disability or death, then there is liability for compensation.

The following workmen's compensation cases are analyzed for the purpose of showing pre-existing syphilis as the sole cause of the disability or death, and the consequential denial of compensation by the courts. In these cases it will be noted that all or several of the following four elements are present:

1. No direct causal connection or relation between the injury and the disability or death.
2. The injury or strain is slight in nature (occasionally may be serious).
3. The lapse of time between the injury and the disability or death is (either too short or) too long to show a causal relation between them.
4. The employee's suffering from an active and progressive condition of syphilis at the time of the injury (sometimes the syphilis may be dormant).

CLAIMANT's husband, a laborer, was walking from the tool shed to the construction site, upon a road which rose at a 6° incline. After walking about 22 feet on this road, he suddenly collapsed and died almost immediately. Blood taken from his heart, upon test, showed a plus 4 Wassermann.[5]

The elements present in this case are Numbers 1, 2, 3 and 4, especially 2 and 4.

A 10-POUND piece of timber struck claimant's shoulder. Soon after, claimant had to quit working because of pain connected with an enlarged heart and arteries. The medical testimony was that x-ray photographs showed no fracture, that the injury was a light one and could not have caused such an ailment, that a blood test showed plus, and that claimant's condition was caused by syphilis.[6]

In this case, the elements present are Numbers 1, 2 and 4, especially 2.

A MINE car rolled against claimant, a miner, and injured his back. He claims permanent disability. The medical testimony was that claimant was a positive syphilitic, viz: moth-eaten appearance of his hair, knee motions, ankle reflexes and sight reaction to light all very sluggish; and that his disability was not the result of traumatism, but due to a highly degenerative condition caused by syphilis.[7]

The predominant element in this case is Number 4.

WHILE pushing a wheel truck, claimant slipped and fell, and sustained a hernia. Claimant testified that his head also struck the floor very hard. Claim is made for paresthesia of the entire left side of his body which occurred four months after the accident. The medical testimony revealed that a Wassermann test on claimant showed a plus 4, and that paresthesia resulting from trauma would develop within 60 days at the very latest from the date of the injury.[8]

In this case, elements Numbers 3 and 4 are present, especially 3.

CLAIMANT, a miner, testified that a 600-pound hunk of coal struck his head, knocked him unconscious, and caused the loss of the sight of his right eye eight months afterwards. The medical testimony was that x-ray photographs revealed no scar on claimant's head, and that his optic nerve showed a simple non-inflammatory atrophy which was caused by tabes dorsalis.[9]

Elements Numbers 1, 2 and 4 are present here, especially 4.

CLAIMANT, a driver, slipped and fell off his

1. The law stated in this article likewise applies to other similar pre-existing disease, such as gonorrhoea, osteomyelitis, arthritis, tuberculosis, heart disease, etc.
2. GRAY: Attorneys' Textbook of Medicine, p. 354.
3. Expert medical testimony practically decides all questions as to liability and the extent of the disability.
4. *Keller* v *Indust. Comm.*, (1922) 302 Ill. 610, 135 N. E. 98.
5. *Southern Casualty Co.* v *Flores* (1928) 1 S. W. 2nd (Tex.) 260.
6. *Hays* v *C. D. Cotton Oil Co.*, (1925) 1 La. A. 689.
7. *G. A. Coal Co.* v *Davis*, (1927) 220 Ky. 224, 294 S. W. 1029.
8. *Wood* v *L. C. C. & Warehouse Co.*, (1932) 139 So. (La.) 657.
9. *Keller* v *Indust. Comm.*, (1922) 302 Ill. 610, 135 N. E. 98.

bakery wagon, and sustained a spiral fracture of his right tibia. One week later, he became blind due to the injury lowering his resistance to the progress of the disease of syphilis from which he suffers. Claim is made for loss of sight.[10]

The elements present here are Numbers 1 and 4.

CLAIMANT, a track layer's helper, fell off a coal car; his entire body was bruised slightly. Since then, he has been unable to work because of pain. The medical testimony was that the x-ray pictures showed no injury, a Wassermann test showed a plus 4, that there was a bulging mass, with about a pound of pus in it, on claimant's right hip, and that claimant had lumbago due to syphilis, and not to traumatism.[11]

The elements present here are Numbers 2 and 4.

CLAIMANT'S husband, a laborer, while loading cross-ties, each weighing 200 pounds, into a train, suffered a strain on his side, and died six days later. The medical evidence was that he was suffering from syphilis, that nearly all the organs of his body were rotten with this disease, and that death was caused by a hemorrhage of the veins of the wall of the stomach caused by progressive syphilis, and that any slight exertion would have caused his death.[12]

In this case the elements present are Numbers 1 and 4, especially 4.

THE following workmen's compensation cases are analyzed to show that although there may be pre-existing syphilis, yet compensation will be awarded for disability or death, provided all of the following four elements are present:

A. Direct causal relation between the injury and the disability or death.

B. The injury or strain is serious in nature (occasionally the injury may be slight).

C. The elapse of time between the injury and the disability or death is such as to show a causal connection between them.

D. The syphilis is dormant (it also may be active and progressive).

A BULL attacked claimant, a gate tender, and crushed him against a fence in the defendant's stock yards, fracturing his hip bones. He was disabled for five months. After working for six months, he suffered a paralytic stroke which affected the left side of his body. X-ray and neurological examinations and tests of claimant's blood and spinal fluid revealed that he was suffering from cerebral spinal syphilis.[13]

All the elements are present here, especially B.

A 50-POUND bundle of wood fell against claimant's shin, causing a slight bruise. Three days later, the bruise started to bleed, and shortly thereafter there was a discharge which lasted for one year, disabling claimant for that time. The medical testimony was that claimant was a syphilitic, that the injury was periostitis, and that a running sore might set up in a healthy person without breaking the skin.[14]

In this case all the elements are present, especially A.

CLAIMANT was suffering from syphilis which had become localized in the right shoulder joint. He sustained an injury to this shoulder joint by a blow which lighted up this syphilitic condition and disabled him from working.[15]

All the elements are present in this case.

CLAIMANT, a teamster, sustained a broken leg. The medical testimony was that plaintiff was afflicted with syphilis, and that an ordinary healthy man would recover from such an injury in eight weeks. Claimant is seeking 300 weeks compensation.[16]

All four elements present here.

CLAIMANT, a syphilitic, was struck on his arm and forehead by flying pieces of concrete. These injuries appeared to be superficial. Soon after, an abscessed and diseased condition appeared on the injured parts.[17]

In this case all the elements are present.

CLAIMANT, a miner, was pushing a coal car, when he fell back with the weight of the car on his right arm, twisting it. Claimant was afflicted with dormant syphilis. He was disabled four months.[18]

All four elements are present in this case.

CLAIMANT'S husband, a hatch tender, on board a boat was required to be on his feet most of the time and give signals to loaders. One day, while working continuously for 16 hours, his nose and mouth suddenly started to bleed. He continued to work for another five hours, then went home and died the next day. An autopsy revealed that he had aneurysm of the descending aorta, which had ruptured, and that this aneurysm was of long standing and was caused by syphilis. There was medical testimony that the long period deceased worked that day was such a strain as would cause a rupture of the aneurysm.[19]

In this case all four elements are present.

CLAIMANT'S husband worked for two years under excessive heat in cleaning and repairing boilers of a power company. One day he collapsed at the plant. An immediate examination showed that he was suffering from mitral regurgitation, and he therefore was sent home. A month later he died. Medical testimony was that he was afflicted with syphilis which had impaired his heart, and that the conditions under which he had worked had hastened his death.[20]

All the elements are present here.

CLAIMANT'S husband slipped off from a scaffold, and fell head down five feet, his head striking some bricks. He was dazed, and had to be helped to his feet by his co-employees, and was taken home. He soon became insane and three months later died. Deceased was suffering from syphilis in its terminal stage, although he appeared to be in sound health.[21]

All four elements are present in this case.

In the majority of these workmen's compensation cases, the attorneys representing the defending employer or the insurance carrier, in the course of trial, at one time or other, have made something like the following argument in support of their contention that "if the law held that the acceleration or aggravation or prolongation of a disease (syphilis) by accidental injury sustained

10. *Borgsted* v *Shultz Bread Co.*, (1917) 180 App. Div. 229, 167 N. Y. S.647.
11. *N. S. Coal Co.* v *Indust. Comm.*, (1922) 304 Ill. 613, 136 N. E. 783.
12. *Jackson* v *Traveler's Ins. Co.*, (1934) 151 So. (La.) 790.
13. *St. L. Stock Yards* v *Indust. Comm.*, (1928) 329 Ill. 221, 160 N. E. 114.
14. *G. Lumber Co.* v *Rengler*, (1922) 190 N. W. (Neb.) 578.
15. *Bongialatte* v *Wales Lumber Co.*, (1922) 97 Conn. 548, 117 Atl. 696.
16. *Durrett* v *Woods*, (1924) 155 La. 533, 99 So. 430.
17. *D. Const. & Rep. Co.* v *Beasley*, (1924) 146 Md. 568, 126 Atl. 907.
18. *P. Q. Mining Co.* v *Indust. Comm.*, (1922) 59 Utah 402, 204 Pac. 323.
19. *Southern Shipping Co.* v *Lawson*, (1933) 5 Fed. (2d) 321.
20. *Pace* v *N. D. Workmen's Comp. B.*, (1924) 51 N. D. 815, 201 N. W. 348.
21. *Millers' Ind. Underwriters* v *Schrieber*, (1921) 240 S. W. (Tex. Civ. A.) 963.

in the course of or arising out of the employment is compensable under the Workmen's Compensation Law, the result would inevitably be that industries generally would soon insist that all applicants for work should pass a rigid physical examination, and that needy workmen suffering from any form of ailment or disease (syphilis) would thus be deprived of full and equal opportunity of obtaining employment."[22] The answer to this argument, declared the Supreme Court of Utah,[23] " is found in Madden's Case, 222 Mass. 487, 111 N. E. 379:" 'It is argued that grave economic consequences of far reaching effect may follow from the act as thus construed. It is said that persons not in good health may be altogether excluded from employment to their severe hardship, while the cost of conducting commercial and industrial enterprises may become prohibitively large, all to the detriment of the general welfare and of the financial resources of the commonwealth. These considerations are of great public moment. But these factors relate to legislative questions and arguments founded on them are distinctly legislative arguments. They may be entitled to the attention and deliberation at the hands of the legislative department of the government. In the present forum (the judiciary) they cannot have decisive significance, even if it were plain that the enumerated consequences were inevitable. The function of the judicial department of the government is simply to determine whether an act is within the power vested by the Constitution in the Legislature, and then to enforce it according to its true meaning in cases as they arise.' "

Mental Attitudes

— *Their Relationship to Industrial Accidents* —

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IN RECENT years a great deal of thought has been given by employers to the prevention of accidents, and there is extensive legislation compelling care for the lives and health of industrial workers. However, these efforts are generally confined to safety engineering and mechanical devices; they do not take into consideration the mental attitudes of the workers themselves which are, as a matter of fact, the prime causes of most industrial accidents. Ninety per cent of accidents are known to be of mental origin. They result not from insanity or continuous mental incompetency, but from thoughtlessness or carelessness. Whatever may be the immediate proximal cause of an accident, on thorough investigation the underlying cause will, in the majority of cases, be found to be some mental aberration on the part of the worker resulting in inattention, carelessness, confusion or bad judgment. You cannot put a protecting fence around these mental attitudes as you can around a band saw. They must be guarded against in some other way. A man who is comfortable in mind and body and at ease with himself, adjusted to his work, to his environment and to his home life, and whose work record is good, shows that he is not sick, perplexed, fatigued, misplaced, inadequate or discontented. Such a man is not predisposed to become a causative factor in an accident. Consequently if measures can be provided which will provoke such a combination of circumstances we will go a long way in the prevention of industrial accidents.

Since, according to good authorities, such a high percentage of accidents have as their prime cause the mental attitude of the individual at the time of occurrence; so-called "acts of God," and other less definite causes are responsible for part of the remainder. Really only a small percentage of industrial accidents, at the present day, are due to mechanical failures.

WHEN we speak of the mental attitude of workers, we must remember that work is a dual performance involving both mind and body. Both must be in close cooperation. All of the mental faculties must be kept tuned to the movements of the body and direct them. If this cooperation of the mental faculties with the physical work in hand is lacking, and there is inattention, an accident is likely to happen. The mental faculties must not be allowed to wander, nor must they be concentrated on one obsessing idea. Some philosopher has observed that when the mind is fully occupied we lose all conception of time, and it is a matter of common knowledge that when our mental faculties are concentrated too deeply on some engrossing idea we are not conscious of pain or of other sensory phenomena going on about us. A worker who is mentally distracted by some obsessing problem or attitude outside his immediate field of work may automatically go through his routine motions, but his mind will not be applied to his work, and under such circumstances an accident may occur. Such cases of day dreaming, whether of the anticipatory or retrospective type, or simply limited to what we call worry, make up a large number of those instances where distorted thinking has resulted in painful and crippling accidents.

Loss of self respect, whether from real or imaginary causes; weak indecisive vacillating characters, whether through early lack of training or through suppression by immediate superiors; emotional states of inordinate happiness or depression, anger from provocation or through general irritability, surprise, fatigue, criticism, fear, anxiety and irksomeness at restrictions are all attitudes which predispose to the occurrence of accidents and point the need for their correction or elimination in order to obviate both the resulting poor work and the accidents arising from them.

Since there is no place in industry for the feeble minded, the epileptic, the constitutionally frail or the sick, the arteriosclerotic, alcoholic, late syphilitic, or the senile, this type of case is not included here. Their recognition is comparatively easy and calls for drastic elemination in their own interest and that of fellow workers.

While accidents to individuals in other conditions, such as in the streets, follow the laws of chance, industrial accidents are not distributed equally among all workers as matters of chance; there is a certain amount of predisposition in these latter. A proportion of workers, stated by Bristol to be about one-fourth, are what is called "accident prone" individuals. It is with this 25%

22. *P. Q. Mining Co.* v *Indust. Comm.*, (1922) 59 Utah 402, 204 Pac. 323.
23. *Ibid.*

of workers that we have to deal particularly. These will be found to be the same men who have the most errors in their work, the poorest attendance records, and who react more slowly or more unwillingly to supervision. Sometimes they are vocational misfits who have no relish for their jobs. They give the impression of being inattentive, hurried, worried and subject to mental tension. These characteristics are really dependent on deep-lying mental attitudes due to fear, depression, constant grudges against capitalism, resentment towards bosses, domestic troubles, chronic alcoholism, and perhaps, some subnormal mentality; sometimes they are over exhilarated, unduly emotional or have an inferiority complex, or perhaps a kind of a superiority complex typified by an "it-cannot-happen-to-me" attitude. All these, which are mental attitudes, as well as mental fatigue, expose these workers to hazards.

Industrial mental hygiene has attracted much more interest in other countries, Russia, Italy and Germany, especially, than in the United States. Zacharoff states that in the Union of Soviet Socialist Republics mental hygiene in industry has received very considerable governmental attention and has been developed in two main directions, vocational and prophylactic. The first is met by fitting individuals to their work and by the scientific management of industry; the second is met by concentrating prophylactic psychiatry on nervous and mental complaints arising from condition in industry and the private life of workers. Extensive dispensary and home medical supervision is provided. In Italy, which since the time of Ramazzini has been the home of improving the hygiene of labor, the mental factor in industrial hazards also receives great attention, and in Germany the same is true to a lesser extent.

Of course, in these countries where the workers are merely state pawns without individual liberty, regulations of any and every kind can be rigidly enforced.

In the United States but little has been done to obviate industrial accidents by better mental hygiene. In some large plants medical supervision includes home visits and helping with domestic problems, but this is done as a social service and not so much as a safeguard against accidents. Bristol, of the American Telephone and Telegraph Company, says; "Mental hygiene in industry is only on the threshold of development. As interest grows in this important subject, which underlies the whole realm of safety and physical health, more and more industries will be thinking in terms of mental and nervous systematic examinations in connection with their routine physical appraisals."

Anderson brought this subject to the notice of the First International Congress of Mental Hygiene in 1932.

Up to now, generally, our efforts have been confined to scaring and warning men by means of posters and safety conferences and demonstrations depicting the horrible results of accidents and indicating the proper safety measures. Scant attention has been given to showing workers the very important role they themselves play in the causation of accidents by their mental attitudes, and to change these attitudes, for these mental states can be changed or molded if dealt with in the proper manner.

INDUSTRIAL mental hygiene programs will, of course, vary with the size and importance of plants. The larger concerns can afford more complete mental hygiene service, while the smaller ones will be more or less restricted.

As a means for assisting in correcting improper mental attitudes of individual workers and improving the morale of groups, Grannis sketches three types of industrial mental hygiene programs:

First: A department of mental hygiene under direction of a psychiatrist, who, with his special knowledge of human motives, appreciates the significance of various attitudes and will be able to discover and treat mental conflicts, repressed desires, feelings of inferiority and various kinds of neurotic incapacity; he can also judge ambition and lack of incentive and to a great extent correct vocational misfits.

Second: If a psychiatrist cannot be provided then an industrial psychologist might be included in the health staff of the plant. This should be a person of experience in mental hygiene, with some knowledge of medicine, working under the guidance and supervision of the industrial physician.

Third: If neither of the foregoing plans can be made effective, some consideration of the mental causes of accidents should be given by some proper person even though not professional. This might be done in connection with the employment bureau of the plant and would be in fact, in some measure, a department of vocational guidance. This department should also undertake home visits, make suggestions to individual workers and especially re-orientate those with high accident records—"accident prone" individuals who are usually accident repeaters. This department should always, of course, be under the supervision of the plant physician and be a link between him and the employment bureau. It would be of great value in obtaining facts regarding the psychology both of workers and those seeking employment, the latter being subjected to a psychologic as well as a physical examination. The views of applicants regarding principles of management, open shop, closed shop, sit down strikes, drinking, and any other matters that might be deemed to be a possible cause of developing undersirable mental attitudes, could be discovered and unsuitable applicants discarded and accident prone workers disposed of.

The personal contact of the mental hygienist with workers may bring to light errors in supervision and management which irritate the men and which are unknown to executives. Also the survey of groups may suggest improvements in working conditions, relaxation periods, elimination of noise, poor light, bad air, and other hygienic defects which not only cause mental fatigue, but also result in defective work. Even healthy subjects develop mental symptoms under such circumstances.

Executives of industrial plants should be particularly interested in industrial psychology and industrial hygiene. Apart from the "accident prone" individual, mental attitudes which result in accidents may be developed in fatigued workers; in those kept excessively on one operation without a rest or change; in those who show nervous tension from any cause. By correcting or preventing faulty mental attitudes much more is gained than reduction in accident records.

The work of the industrial mental hygienist is of course an addition to the usual accident prevention program which deals only with mechanical and physical safeguards. In his efforts to eliminate accidents caused directly or indirectly through faulty mental attitudes much assistance can be rendered by the industrial nurse. A friendly active interest in the employee and his work helps materially in increasing his self respect, and an expression of concern for his welfare adds to his feeling of importance to the plant and his own self regard. If kept within normal limits this is a highly desirable goal. A straight forward dignified approach to questions of policy in the handling of any situation involving the health of the employee will generate confidence in the worker and the plant for which he works. An understanding appreciation of the difficulties under which labor is sometimes performed will often provide the means of combating the angry broodings of the worker. Fear, criticism, and anxiety can often be minimized by a reassuring attitude and the tactful exposure of their groundless character. Solicitude should never be overdone, or the problem of self pity become the forerunner of a chronic neurosis or a malingering. An optimistic outlook, a cheerful smile, a dignified sincere approach make the industrial nurse invaluable as an assistant in rendering the worker safety-prone.

In only a general way have the wide aspects of mentality in connection with industrial accidents been discussed. This phase of industrial safety is more or less new, but we are surely beginning to realize that the mental attitude of the worker is a far more important factor in the causation of accidents than was believed, and that for the elimination of such accidents we must deal adequately with this factor. Safety depends not so much upon thinking about safety, nor in allowing our own problems or attitudes to dominate our thoughts, but is directly contingent upon our concentration on the work at hand while that work is being done. Accident prevention can only be furthered through an understanding of disordered mental processes and the adoption of measures to promote clear thinking.

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Southern Railway Surgeons

THE fortieth annual meeting of the Association of Surgeons of the Southern Railway System, will be held at the Seminole Hotel, Jacksonville, Florida, June 8, 9 and 10. DRS. E. DUNBAR NEWELL, Chattanooga, Tennessee, W. H. FRAMPTON, Charleston, South Carolina, and W. W. HARPER, Selma, Alabama, are in charge of the program.

The Health of Cement Workers

A. J. R. CURTIS,

Secretary of the Committee on Accident Prevention and Insurance of the Portland Cement Association, Chicago

HEALTH and safety in the cement industry are under the general guidance of the committee on Accident Prevention and Insurance of the Portland Cement Association, members of which operate 152 of the 176 cement plants in the United States and Canada. The effective manner in which we are prepared to deal with these matters may be judged by the fact that our safety program has resulted in the elimination of more than 90% of our plant accidents in 10 years.

The health of cement workers is not a new subject nor is it an unknown factor with us. Careful physical examination of thousands of cement workers (with recurrent examinations in many cases) not only shows these workers free from illness arising from their occupation, but also would indicate that as a group the condition of their health is in no wise below that of the general working class. In some important respects, the cement group seems healthier than the population at large.

The following table (Table 1) of death rates per 100,000 gainfully occupied male persons, was carefully compiled from all comparative data on the subject that could be secured. The outstanding feature of the table is, of course, the comparatively low death rate among cement workers from tuberculosis of the respiratory system.

Social-Economic Class and Component Occupations	Death rates per 100,000 gainfully occupied males in age group, 15-64 years: All Causes	Diseases of the Heart	Tuberculosis of the Respiratory System
Cement Workers (all ages)	781.25	146.1	42.58
All Gainfully Occupied Males in Selected Occupations	906.5	174.4	87.4
Agricultural Workers: Farm Owners, Operators and Farm Laborers	673.9	109.3	46.7
Skilled Workers and Foremen: Members of Skilled Trades	866.5	176.2	74.2
Semi-Skilled Workers: Manufacturers, Bakers, Chauffeurs, Barbers, Guards, Operatives in Manufacturing	900.6	168.1	98.2
Unskilled Workers: Laborers, all kinds; Servants and Janitors	1441.6	242.5	183.1
All males in the U. S. Registration Area	897.9	159.7	91.4

Table 1. Death rates from specified causes per 100,000 gainfully occupied males in 10 selected states—Alabama, Connecticut, Illinois, Kansas, Massachusetts, Minnesota, New Jersey, New York, Ohio and Wisconsin—based on U. S. Census figures, 1930, compared with death rates, per 100,000 years' exposure, of workers in 68 cement manufacturing plants. All rates except for cement workers from "Death Rates by Occupation," by National Tuberculosis Association

Less than half the average rate for all male persons in the registration area and less than one-fourth the rate for unskilled workers, the tuberculosis rate for cement workers is especially significant, as the presence of tuberculosis is generally recognized as one of the chief indices of silicosis.

Moreover, this statistical evidence seems to substantiate traditional claims of remarkable freedom of cement and lime workers from tuberculosis.

What Earlier Investigators Say

TWENTY-FIVE years ago the chief factory inspector for Great Britain stated with respect to the health of cement workers, in his annual report:

"Careful inquiry has been made as to the effects of dust on the health of the workers. Sick clubs exist in a number of the factories and particulars as to mortality, invalidity and sick pay appear to show that the trade is on the whole a healthy one. Deaths are few, absences from work rare and generally due to influenza, colds or accidents, and sick pay is small. There is often more invalidity among the workers in non-dusty processes than in the dusty occupations of kiln drawing, milling and packing."

In 1913 and 1914, Dr. George E. Tucker made a careful study of health conditions in the cement mills of southern California and soon thereafter, as a representative of the medical profession in California, was requested by the legislature, state board of health, and cement manufacturers, to conduct conclusive investigations and to report back to the legislative committee and the state board.

Dr. Tucker's report was based on the examination of a large number of men in all of the plants in this district, public hospital records and a review of available literature. The evidence did not support the claim that cement workers are prone to pulmonary diseases and affectations of the eyes, nose and throat, but on the contrary these diseases, which one might presume would be present among men engaged in dusty occupations, were much less prevalent among cement workers than among men engaged in industries where there is no exposure to dust.

Dr. Tucker's investigations were on quite an extensive basis, his physical examinations at the Riverside plant alone including some 956 employees and several hundred applicants for employment. X-ray studies gave uniformly negative results as did a series of experiments on guinea pigs. His principal conclusion was as follows:

"As a result of an investigation of the dust problem in conjunction with the manufacture of portland cement, based upon the review of literature on the subject, the examination of 956 employees in one plant, examination of men employed in the dusty departments of four other mills, the medical records of employees and guinea pig experimentation, there appears to be no evidence of injurious effects from cement dust upon employees engaged in its manufacture."

Frederick L. Hoffman, statistician for the Prudential Life Insurance Company, writing to Dr. W. F. Snow, former secretary of the California State Board of Health, about the same time says:

"The evidence of medical men and others is generally negative. Pulmonary complaints, phthisis and asthma, appear to be conspicuously absent. There is no evidence of life being shortened, but on the contrary, the longevity of cement workers is remarkable, men being frequently found at work at the age of 60 years and upwards."

Sir Thomas Oliver, a leading British physician and scientist, after a wide experience with the health of workers in cement and other dusty industries, made the following observations in the course of his remarks at the National Safety Congress in 1923:

"Although cement making is a dusty occupation, the workers are remarkably free from any lung trouble, and that obtains not only in this country in the cement factories that I have visited, but also in Europe, and in those which I have seen in England.

"I don't see that there is anything in cement making that brings it under the category of dangerous trades, nor do I find that in cement making there is anything that can be called an industrial disease. On the whole, the longevity of the cement maker is quite equal to that of the average of other people."

Range of Diseases Considered

PRESENT interest in occupational health hazards centers largely on the pneumoconioses (dusty lung conditions) of which silicosis is the most important. But in order to obtain a fairly well rounded picture of health conditions in the cement industry, let us consider the following ailment groups:

—respiratory
—abdominal and digestive
—miscellaneous, including rheumatism, arthritis and genito-urinary; eyes; dermatitis.

RESPIRATORY CONDITIONS: — PNEUMOCONIOSES: The only pneumoconioses that are known to be disabling are silicosis, asbestosis and anthracosilicosis. But a few other pneumoconioses have been officially designated by name. Since there are so few pneumoconioses that may be disabling under any circumstances, those determined to bring damage suits against dust industries frequently allege disabling diseases which are not known to be either caused or aggravated by the inhalation of dust. Such suits frequently allege pneumonia, tuberculosis, bronchitis, peri-bronchitis, influenza, siderosis, bronchiedasia, and such vague terms as "all lung disability" and "injury to chest and lungs." These allegations are all nonsense although they may have great weight with lay juries.

IS ALL DUST HARMFUL? The idea has been advanced occasionally that all dust is harmful to the respiratory system. One might say, with far greater accuracy, that no dust is harmful to the respiratory system unless introduced continuously over long periods in very great concentration. Everyone inhales a great deal of dust; yet most of us thrive.

The elaborate and effective system of protective devices which guards the lungs was not suddenly developed to resist recent industrial dusts. Protection against heavy dust concentrations was either provided by the Creator at the outset or these protective devices have come down to us through generations of resistance to heavy exposure.

Nevertheless it is possible for the respiratory system to be loaded with dust above its capacity

with resultant hazards to health. (The digestive system becomes overloaded occasionally but in that case do we conclude that all food is harmful?)

In determining what dust concentrations may be harmful, differences in dust characteristics as well as in the tolerance of individuals would have to be taken into account. Thousands of men of various races, types and ages have been exposed to dusts such as those encountered in cement manufacture, over periods of many years, with no harm that capable specialists have been able to discover.

Industrial dusts have been classified mainly in three groups: (a) Soluble or absorptive; (b) inert, and (c) proliferative. Dr. Carey P. McCord, in *Surgery, Gynecology and Obstetrics* for August, 1936, includes portland cement, as do other classifiers, among the absorptive or harmless dusts. It is probable that insoluble dusts might accumulate in the lungs and cause damage at concentrations which would not be hazardous in the case of readily absorptive dusts encountered in cement manufacture.

Silicosis: Silicosis results only after the inhalation over a period (usually several years, rarely measurable under two years) of silicon dioxide strictly limited as follows:

1. No silicate or other silicon salt except free SiO_2 (principally quartz) has been found to produce silicosis.
2. Little SiO_2 over 7½ microns and none over 10 microns in largest dimension can enter the lungs. The condition seems to result principally from inhalation of particles in the one to three micron range.
3. It is generally accepted that persons can continue indefinitely to breathe air containing less than 5,000,000 particles per cubic foot of 100% free SiO_2 (under 7½ microns) without injury. (Light field determinations).

Most of the studies have been made on dust that is predominantly free silicon dioxide but there is little question about the benevolent effects of such other dusts as calcium carbonate (the major raw material in cement) when present with the silica.

Experience has shown that in order to make a positive diagnosis of silicosis an accurate industrial history must indicate exposure to heavy concentrations of SiO_2 over a period of usually five years or longer; the diagnostician should have the advantage of a medical history and a painstaking current examination; a flat x-ray plate may not be sufficient—positive diagnosis may require stereoscopic, lateral and oblique views. But medical witnesses in suits frequently testify that a man has silicosis, after merely looking at a flat plate.

We are competently advised that in industry at large, few of the many cases diagnosed as silicosis are actually silicosis. Of the relatively few cases of actual silicosis the most capable authorities tell us that few indeed are actually disabling. Many of the best medical men on this subject agree that only those who have silicosis complicated with tuberculosis ever suffer actual disability. But in many of these silicosis suits that are brought, nobody questions much whether there is disability; "silicosis" is alleged and impressed on a jury to whom the disease is pictured as an insidious, painful and disabling affliction resulting in certain death.

What is the Possibility of Silicosis in Cement Plant Employment? Can a cement mill or quarry worker acquire any disabling pneumoconiosis as a result of his occupation? As there is no asbestos or anthracite coal around cement plants, asbestosis and anthraco-silicosis need not be considered; we have left for consideration only silicosis, the sole remaining pneumoconiosis known to be disabling.

Let us consider whether there could be a potential silicosis hazard in cement plant employment, starting with a discussion of the nature of cement dust and the raw material dusts encountered in cement manufacture.

It will be noted from Table 2 that no free silica or silicon dioxide (SiO_2) is actually present in portland cement, the only compounds of the element silicon being the harmless tricalcium silicate and dicalcium silicate. The negligible exception to this statement is the possible presence of a little free silica in the insoluble residue. Free silica in this residue is found to average three-hundredths of 1%, all particles being too large to enter the lungs.

	Lot A	Lot B	Lot C	Lot D	Lot E
	%	%	%	%	%
Tricalcium Silicate ($3CaO.SiO_2$)	48	43	53	50	45
Dicalcium Silicate ($2CaO.SiO_2$)	24	30	18	22	25
Tricalcium Aluminate ($3CaO.Al_2O_3$)	11	11	12	13	10
Tetracalcium Aluminoferrite ($4CaO.Al_2O_3.Fe_2O_3$)	8	6	9	7	11
Magnesium Oxide (MgO)	3.0	5.1	1.9	2.4	2.5
Calcium Sulphate ($CaSO_4$)	3.2	3.0	3.0	3.2	3.8
Loss	1.4	1.0	1.8	1.5	1.1

Table 2. Computed Compounds Existing in Typical Samples of Portland Cement

The error is made occasionally of assuming the presence of free silica in cement because silicon compounds present are reported merely as "Silica (SiO_2)" in routine chemical analyses. The explanation is that the chemist has no ready method of reporting the silicon compounds otherwise and that their exact nature has had no bearing on the purposes to which these analyses are ordinarily put.

These data indicate why there is no possibility of a silica hazard from cement dust.

Enlightening information as to the air-borne dust in the raw side of cement mills comes from a report by the Saranac Laboratory on a study made in 1936 in a cement plant at Nazareth (in eastern Pennsylvania). The report states:

"The values for free silica listed in Table 3 show that the percentage of quartz is somewhat lower in dust floating in the air and higher in dust which has settled out than in the original raw rock. This condition has been observed before (for example, in the experimental dust chambers of the Saranac Laboratory) and suggests that the hazard is less serious even than the composition of the raw rock alone would indicate."

Cement plant dusts are spectacular. Because of their light, contrasting color and particle characteristics, they are more visible than most dusts. Visible dusts are easily suspected of injury by those who do not distinguish between harmless and harmful constituents or who do not know that dust particles that can be seen readily in the breathing air are usually too large to enter the lungs.

Since dust particles of any kind must be under

10 microns in maximum dimension in order to enter the lungs, particles above that size constitute no hazard. The size range of both raw and finished particles in cement manufacture is very largely above this figure and because of its greater hardness, any quartz present grinds coarser than the relatively soft compounds of calcium and other minerals.

Relatively high dust concentrations present in the pioneer cement operations have been greatly reduced by the installation of dust-tight machinery and by the use of dust precipitating and exhaust systems and wet methods of drilling and conveying. So measurements of dust concentrations in American plants at this time could give no true idea of the exposure during the long periods of service of many of our veteran workers.

	Raw Rock			
	Pulverized Raw Rock	Air-floated Top of Stone House	Settled Top of Stone House	Ground Clinker
*SiO_2	*13.8%	*13.6%	*17.0%	*20.7%
Fe_2O_3	0.7	0.6	1.0	1.2
Al_2O_3	4.5	6.0	7.7	7.9
CaO	41.8	40.2	36.5	62.9
MgO	1.7	1.8	2.6	3.3
SO_3	0.7	1.0	1.1	1.7
Loss on ignition	35.9	35.9	33.2	2.5
Acid Insoluble Portion	18.	8.	24.	0.5
Free Silica:				
—Petrographic	2	2		0
—Chemical	6	2	10	0

*SiO_2, referring to the raw rock, indicates total silica, both combined (in silicates) and free (in the form of quartz), the latter form being of negligible quantity, less than 1%. In the ground clinker the proportion indicated as SiO_2 represents the silica present in the various silicates in the clinker, none of which has any significance in relation to silicosis hazards. All of the free silica in portland cement is contained in the insoluble residue. (This residue for American brands averages about two-tenths of 1%.)

Table 3. Chemical and Petrographic Analyses of Samples Plant in Nazareth, Pennsylvania, District

Careful examinations prove these veterans free from any illness due to dust. Might we not conclude that more recent workers, exposed to far lighter concentrations of the same dusts, would fare equally well?

Dust counts made in 1936 by the Saranac Laboratory in a cement plant at Nazareth, Pennsylvania, previously referred to, gave results as shown in Table 4. Workers do not remain continually at all of these points. The position at the top of the stone house, for example, is visited only occasionally.

The report continues:

"Little dust was associated with operations in the quarry. Even drilling with a jack-hammer drill produced only a small amount of dust, the average concentration by light field count being less than 10 million particles per cubic foot of air."

Adequate ventilation in cement plants is carried out to an ideal degree, as the buildings in which the mills and kilns are located are always quite open. Modern kilns release no impurities. Since in no department is the occupation sedentary in character, there is no objection on the part of the employees to proper ventilation. In this connection it may be observed that in industries where silicosis is found it is among workers in closely confined areas such as mines, tunnels and enclosed workrooms, but so far as we are aware, seldom among those employed in quarries or well ventilated or open areas.

Physical Examination of Workers

IN VIEW of the small proportions of free silica present in the raw side of cement mills and in quarries and the relatively coarse size of such particles, the entire absence of free silica in the finish side of the mill, and the relatively low dust concentrations and plentiful fresh air at all working points, it is not at all surprising that the examination of hundreds of cement workers by the U. S. Public Health Service, Dr. Tucker and others, has failed to reveal silicosis.

	Particles per cu. ft.	Free Silica
Top of stone house	89,500,000	2%
Coal house	116,500,000	1-2 (est.)
Tunnel under clinker pile	103,100,000	0
At bottom of silos	104,200,000	0
At Bates Packer	83,000,000	0
Loading railroad cars	230,500,000	0
Cement "kitching"	176,200,000	0
Unloading empty bags	160,100,000	0
Sewing empty bags	120,600,000	0
Sorting bags	386,700,000	0

Table 4. Light Field Count of Particles in Air Samples—Plant in Nazareth District

The latest available evidence (September, 1936) is the report of the study just completed by the Saranac Laboratory in a cement mill near Nazareth, Pennsylvania, to which reference has been made several times in earlier paragraphs. This is where the cement industry started in the United States and the mill in which the study was made was selected because of its long operation and the exceptional age and tenure of service of its employes. It is doubtful if more than one other cement mill in the country could compare in those respects.

Dr. Gardner's report shows a remarkable condition with respect to the linear markings in the lungs of a working force of 201 men, most exceptional in that one-third of the entire group are above 50 years of age and over half are above 40. Yet the lungs of 78.6% show no changes; 17.9% show a slightly increased degree of linear markings and 3.5% a more marked degree, although of no consequence medically and not chargeable to the inhalation of dust.

The lungs of the oldest worker in the mill, age 78, with 34 years' experience mostly in the raw side and in the packing department, show no change whatever. The worker with the longest mill service, 44 years, who is age 67 and has had a general plant experience mostly in the power house, shows a slight exaggeration classified as A. A similar degree is shown by a boy of 20 years with a working history of less than two years and no exposure to dust. Table 5 shows the classification of linear markings by age groups.

Stereoscopic x-ray pictures were taken of 201 (all) employees of this mill and were interpreted by Dr. H. L. Sampson of Trudeau Sanatorium at Saranac Lake. Dr. Gardner's conclusions, as they pertain to silicosis or other pneumoconioses were as follows:

"The data from both the medical and the engineering reports indicate clearly that there is no silica hazard in the plant surveyed.

"Active tuberculosis, one of the chief indices of

silicosis, is no more common than in the general population; in fact it is much less frequent than in many industrial communities.

"Approximately one-third of the employees are over 50 years of age, indicating that they have no disease that seriously interferes with their health.

"Dust counts have failed to demonstrate enough silica in the atmosphere to produce silicosis or any disabling pneumoconiosis.

Age Group (Years)	Number in Group	O	A	B
Under 21	8	87.5%	12.5%	
21-30	43	97.6%	2.4%	
31-40	49	85.7%	14.3%	
41-50	45	66.6%	22.2%	11.2%
51-60	36	75.0%	20.0%	5.0%
61-70	16	72.7%	27.3%	
Over 70	4	75.0%	25.0%	
All	201	78.6%	17.9%	3.5%

O—indicates no exaggeration whatever of the linear markings.

A—indicates a very slight degree of exaggeration. It has no clinical significance and cannot be ascribed to any particular cause.

B—indicates a more definite exaggeration of the linear markings. Its consistent occurrence in a majority of exposed individuals might constitute evidence that the dust was responsible, particularly if frequency increased with duration of exposure; but since it occurs in but 3.5% of all the cases, it constitutes no positive evidence that the condition is attributable to dust.

Discrete Nodulation, the characteristic lesion of silicosis, was not found in any case.

Table 5. Nazareth Study—1936. Classification of Linear Markings by Age Groups

"While a petrographic and chemical analysis of the raw rock revealed a miximum of 6% of free silica, dust from this material suspended in the atmosphere contained only 2% silica. Dust settled on rafters from the same atmosphere contained 10% silica, more than was present in the original material. This effect of selective settling of silica resulting in abnormal concentrations upon the rafters is in accord with observations that we have made elsewhere and that Hatch and Moke have described in foundries. *(J. Indust. Hyg.,* 1935).

"Not only has there been nothing to indicate a silica hazard, but it could not be demonstrated that the non-siliceous dust had any grave effects upon the men employed in the industry. The lungs of 78.6% of the entire group of 201 showed no change that could be attributable to inhaled dust; in 17.9% there were slight exaggerations of the linear lung markings which could not be correlated with particularly heavy or particularly long exposures to dust. (See Table 5). Since such changes can be produced by causes other than the inhalation of dust it is not justifiable to attribute them to the dust in this plant. The same is true of the seven cases showing a more marked exaggeration of the linear markings in the lung."

Minor Respiratory Disorders

THE opinion has been expressed occasionally that cement dust, even though not responsible for the incidence of minor respiratory trouble, might aggravate such conditions in the upper tracts. In the U. S. Public Health Service Study of 1925, some evidence of this kind appeared in the shape of an unusual amount of short absenteeism, attributed most commonly to colds.

However, in the Saranac Laboratory study at Nazareth, Dr. Gardner found:

"Cloudy nasal sinuses were frequent among all men employed for 35 years or less, although there was no progressive increase in the successive periods of employment. Rhinitis was found in 14% of the men when they were examined and about the same number gave a history of colds. In most instances, however, such colds were isolated occurrences and were not often repeated.

"Influenza was frequent during the epidemic of 1918 (24%) and approximately 6% of the men reported attacks at other times. Pneumonia occurred in another 6% of the men.

"However, it was not possible to correlate these respiratory infections with dust exposure in any particular part of the plant. They were highest in the quarry group (55%) who work out of doors in all kinds of weather. Next most frequently involved was the heterogeneous group composed of clerical assistants, repairmen, electricians, mechanics, etc., who had occasional dust exposures but who might be exposed to marked variations in temperature and weather. Cloudy sinuses occurred in only 36% of the employees in the bag and pack houses where the dust counts were highest. Therefore one must conclude that cement dust alone is not responsible for disease in the upper respiratory tract."

Absenteeism from Respiratory Causes

INTERESTING information as to the place respiratory ailments hold as a cause of absenteeism in the cement plants is presented in a study

	Absentees	
	Number	%
All	655	100
Head Colds	274	41.83
Influenza	167	25.50
Chest Colds	123	18.78
Sore Throat and Tonsillitis	51	7.78
Pneumonia	18	2.75
All Other	23	3.36

Table 6. Respiratory Illnesses—Number

	Days Lost	
	Number	%
All	2842.93	100
Head Colds	680.50	23.94
Influenza	1004.58	35.33
Chest Colds	394.83	13.89
Sore Throat and Tonsillitis	51	7.55
Pneumonia	346	12.17
All Other	202.50	7.12

Table 7. Respiratory Illnesses—Total Days Lost

	Average Days Lost
Pneumonia	19.22
Influenza	6.02
Sore Throat	4.21
Chest Colds	3.21
Head Colds	2.48

Table 8. Respiratory Illnesses—Average Days Lost

of this subject for the year 1935 in which 31 cement mills, well spread out over the United States and Canada, participated. Tables 6, 7 and 8 from that report, show the relative importance of various illnesses of the respiratory group.

Abdominal and Digestive Illnesses

WITH regard to disorders of this group, no abnormality was found in recent physical examinations. Our absenteeism study of 1935 gives merely a normal picture, which may be visualized quite readily from Tables 9, 10 and 11, taken from that study.

	Absentees	
	Number	%
All Abdominal Complaints	227	100
Indigestion and Stomach Trouble	146	64.31
Intestinal Disorders (Unclassified)	50	22.03
Genito-Urinary	17	7.49
All Other Abdominal Complaints	14	6.17

Abdominal Illnesses—Number of Absentees

	Days Lost	
	Number	%
All Abdominal Complaints	1691.54	100
Indigestion and Stomach Trouble	1042.54	61.63
Intestinal Disorders (Unclassified)	242.50	14.34
Genito-Urinary	226.50	13.39
All Other Abdominal Complaints	180	10.64

Table 10. Abdominal Illnesses—Total Days Lost

	Days Lost
	%
Genito-Urinary	13.22
Indigestion	7.14
Intestinal	4.85

Table 11. Abdominal Illnesses—Average Days Lost

Rheumatism, Arthritis and Other Illnesses

THE absenteeism study of 1935 attributes considerable loss of time to a large variety of miscellaneous illnesses, no one of which is necessarily comparable with the others.

This group accounted for 25% of the illness absenteeism and 39.83% of the lost time tabulated in the study.

The most important of the miscellaneous illnesses, from the standpoint both of the number of absences and number of days lost were rheumatism and arthritis, which were responsible for 42 absences and 507 days lost, an average of 12.07 days lost per case. Thirty-four surgical operations resulted in 552.50 days lost time, an average of 16.25 days per case. Muscular and nerve disturbances, such as neuritis, neuralgia, muscle cramps, etc., were responsible for 34 absences and 144 days lost time, an average of 4.24 days per illness.

The incidence of malaria and chills is interesting because of its territorial distribution. There was a total of 32 cases causing total loss of time of 239.50 days, an average of 7.49 days per absence. Due to the fact that one company combined reports for their four plants, the location of three of the 32 cases cannot be determined. Of the other 29 cases, six occurred in Georgia, five in Alabama, four in Texas, one in Louisiana, and 13 in Missouri. All 13 of the Missouri cases occurred in one plant.

Heart trouble caused comparatively few absences. Four people suffering from heart trouble lost 153 days, an average of 38.25 days per person. The most severe single illness in the miscellaneous group was jaundice, one person losing 143 days because of this illness.

Abscesses, boils, and carbuncles were a fairly important cause of absence. They were responsible for 28 persons losing 135 days, an average of 4.82 days per absence.

Five persons lost 144 days on account of cancer, an average of 28.8 days per person, and five persons were absent 126 days because of nervousness, an average of 25.50 days per person. Thirty-three persons lost 54.5 days on account of dental trouble, an average of 1.65 days per illness.

Eyes

EYE trouble has been limited sharply to conjunctivitis, and almost entirely to packers. Almost invariably the cause has been a fine stream of dust sprayed in the direction of the eyes by the occurrence of a small hole in the sack as the latter is being filled.

The cement is somewhat caustic, scratchy, and sometimes warm, and inflammation may be developed quickly by rubbing.

	Absentees	
	Number	%
All Illnesses	1177	100
Respiratory	655	55.65
Abdominal	227	19.29
All Other	295	25.06
Non-Occupational Injuries	69*	5.86
Occupational Injuries	35*	2.97

* Not included in illness totals

	Days Lost	
	Number	%
All Illnesses	7753.13	100
Respiratory	2842.92	37.52
Abdominal	1691.54	22.32
All Other	3042.67	40.16
Non-Occupational Injuries	660 *	8.71
Occupational Injuries	1628 *	21.65

* Not included in illness totals.

For every day's absence from occupational injury there are 4.62 day's absence from illness.

Table 12. Summary—Number of Absentees and Days Lost

Practically no cases of conjunctivitis are occurring in cement mills at present, due to the general use of protective goggles, instruction against rubbing the eyes, and the provision of apparatus for quickly washing eyes with boric acid solution.

Dermatitis

EVIDENCE of dermatitis has been limited to hot seasons and as cement mill dusts are not toxic in their nature, the condition yields readily to simple hygienic measures.

Few workers are affected even in the absence of precautions. Boils or other manifestations on the body seldom require for their treatment anything more than daily baths with change of underwear.

A small proportion of packers are affected about the hands or forearms, if unprotected. Daily application of almost any neutral grease or cream usually terminates the trouble. In a few cases, gloves and sleeves must be worn.

General

FROM available data it would appear that the incidence of illness in the portland cement industry is about on an average with the illness incidence in general.

It should be quite evident that occupation in the cement industry does not carry with it any serious hazards to health. The most significant illnesses, from the standpoint both of frequency of absences and total amount of time lost, are the less severe types and therefore should be, in most instances, readily preventable. Most of these illnesses are easily attributable to exposure to the weather, malnutrition and disregard for the fundamentals of healthful living.

Systematic health campaigns designed to give employees reliable information on proper living habits should help materially and these are to be suggested in our program for 1937.

Allergy of the Nose and Paranasal Sinuses

Book Review by

M. R. Lichtenstein, M.D.

THIS volume, by French K. Hansel, M.D., M.S., offers the first painstaking and thorough consideration of those conditions in which the combined knowledge of an allergist and a rhinologist are necessary. The author has investigated both sides himself, and has made many important contributions to the subject. To this broad experience in his field he has added very good judgment in his conclusions plus a mountain of work in writing, and has produced a book which undoubtedly will remain the authoritative work on this subject for years.

The book is written in short chapters, and is very well organized, making reference to any phase of the subject matter remarkably easy. Each chapter gives a concise resume of the fundamental research done in its field, with many references, and goes on to give the author's conceptions in a direct, readily understandable manner.

Chapters dealing with the anatomy, physiology, biochemistry, bacteriology, histology and cellular reactions are brief and informative.

Special interest attaches to the work on the cytology of nasal secretions. The author has done much of the original work demonstrating the importance of eosinophilia in the nasal secretion in the diagnosis of allergy. He finds that such studies are of great help in obscure cases of allergic origin and also where allergy and infection are combined. The method is fully described with illustrations, so that adequate instruction is given to those who have not used it.

Methods of skin testing are discussed in great detail, with lists of materials to be used and tables of inhalants and foods to be tested. Other diagnostic methods such as nasal and ophthalmic tests, the leukopenic index and elimination diets are fully described. Every phase of allergic work related to the nose is fully discussed.

Infection of the nose and sinuses is considered mainly from the diagnostic standpoint. The author exhausts every possible method to prove the presence of infection alone or combined with allergy and to evaluate the importance of each in producing the patient's symptoms.

The chapter on x-ray, with plates showing allergic conditions in the sinuses, is informative. There's a full description of methods of radiopaque oil filling of the sinuses and the comparative value of x-ray and transillumination.

The results of treatment by rhinologic and allergic methods are evaluated by statistical methods. The author finds that where allergy is present it must be controlled first, before other complications are treated by rhinologic methods. He relies on the differential eosinophile and neutrophile counts of the nasal secretion, repeatedly studied, to decide the diagnosis, where other methods have failed. If allergy is indicated, he studies the patient from this standpoint exhaustively, leaving secondary infections to be treated later. He finds that in many cases of polyposis the patient suffers repeated acute infections and recurrence after removal if allergy is not controlled. If allergy is controlled first there is a decrease in susceptibility to infection, and a better surgical result.

Allergy and infection, sinus infection, and tonsillectomy in allergic children, are some of the subjects in the chapter on children.

Allergic lesions of the ears, dizziness and Meniere's syndrome provide provocative reading. Allergy and immunity in ophthalmology and their relations to focal reactions in the eye are discussed. Allergic conjunctivitis and keratitis, and vernal conjunctivitis are vexed questions well handled.

The treatment of allergy takes up the last third of the book. Inhalant allergy and food allergy treatment by avoidance and by hyposensitization methods are fully described. Tables showing the relations of foods are given and elimination diets, including daily sample menus are shown. Special mention is made of diets for allergic infants. Food diaries and their use is explained. The non-specific methods of treatment are not neglected.

Ionization, among the other non-specific methods, is given complete consideration. This is timely, as there appears to be a tendency at present among some nose and throat men to use this method as a panacea for hay fever and any nasal condition which proves refractory to the usual rhinologic procedures. Hansel has done careful investigative work on this problem, and his conclusion that hay fever and allergy cases in which a specific cause can be found should be treated by allergic methods will be approved by all students in this field. He thinks ionization may be of use in those extremely refractory cases in which all rational therapy has failed, but warns of the possibility of permanent destructive changes in the nasal mucosa, suppurative sinusitis, loss of sense of smell, or the production of asthma in those who have not had it previously.

Hay fever trees, grasses and weeds are described and illustrations shown. Information concerning every section of the country is separately given in detail. The chemistry of the pollens and the mechanism of nasal sensitization are considered. Methods of making pollen extracts and dosage schedules are given. The pre-seasonal, co-seasonal, perennial and intracutaneous methods of treatment are described carefully.

The book concludes with a chapter containing 23 concise case reports illustrative of various clinical types of nasal allergy.

This volume is remarkable for the ease with which it is possible to find and understand any desired subject. Those who wish only the practical aspects can avoid the reviews of literature and research. On the other hand, those who are interested in original investigation, will find in these sections a critical summary of research and extensive references to the original sources.

Rhinologists will find this book indispensable, since few of them have had extensive training in allergy. Whether they wish to attempt to do the allergic investigation of cases themselves or not, it will provide the necessary liaison which tends toward better handling. General practitioners will find much of interest here on the management of headache, hay fever, vasomotor rhinitis and migraine. To the allergist, this book will bring a better conception of rhinologic methods.

The volume contains 821 pages, with 58 text illustrations and three color plates; is published by the C. V. Mosby Co., St. Louis, Missouri, 1936; and is priced at $10.00.

Midwest Conference: Occupational Diseases

—Jointly with the Twenty-Second Annual Meeting of the American Association of Industrial Physicians and Surgeons—May 3 to 7, at Detroit—

—Programs—

DATE: Five days in early May—3, 4, 5, 6 and 7, inclusive. PLACE: Hotel Statler, Detroit, Michigan. OCCASION: The Midwest Conference on Occupational Diseases; designed to fit in with the practical needs for informative material on occupational disease and industrial hygiene for practicing physicians, engineers in industry, and public health and industrial nurses; and held under the auspices of:

The American Association of Industrial Physicians and Surgeons;

The Detroit Department of Health;

The Engineering Society of Detroit;

The Michigan Association of Industrial Physicians and Surgeons;

The Michigan Department of Health;

The Michigan Medical Society; and

The Wayne County Medical Society.

The Conference is arranged in two main divisions.

The Conference meetings will be held on Monday, Tuesday and Wednesday, May 3, 4, and 5.

THE Twenty-Second Annual Meeting of the American Association of Industrial Physicians and Surgeons will follow—as, and of its own—on Thursday and Friday, May 6 and 7, the interest of the conference merging on those dates in the separate program of the American Association.

From the quality of the programs, *each* of these gatherings will be an outstanding event, and the industrial physician and surgeon fortunate enough to attend *both* of them will remember the occasion as the high spot of the year.

The programs are as follows:

Midwest Conference

—Program—

Monday Morning, May 3, 1937

INDUSTRY AND INDUSTRIAL DISEASE:

Chairman, DR. CLARENCE D. SELBY, Medical Consultant, General Motors Corporation, Detroit.

9:30—The Midwest Conference on Occupational Diseases: Introductory Address by DR. HENRY F. VAUGHN, Commissioner, Department of Health, Detroit.

—Welcoming Address by DR. THOMAS K. GRUBER, President, Wayne County Medical Society, Detroit.

—Industry as a Source of Disease. DR. EMERY R. HAYHURST, Consulting Industrial Hygienist, Columbus, Ohio.

—The Worker as Affected by Industrial Exposures: DR. WILLIAM D. MCNALLY, Associate Professor Materia-Medica and Toxicology, Rush Medical College, Chicago.

—Discussion.

Monday Afternoon, May 3, 1937

PULMONARY DISEASES IN INDUSTRY:

Chairman, DR. BRUCE DOUGLAS, Tuberculosis Controller, Department of Health, Detroit.

2:00—Industrial Factors in Tuberculosis: DR. A. J. LANZA, Assistant Medical Director, Metropolitan Life Insurance Company, New York City.

—Industrial Tuberculosis: DR. ANDREW R. RIDDELL, Division of Industrial Hygiene, Ontario Department of Health, Toronto, Ontario.

—The Surgical Treatment of Tuberculosis with Special Reference to Shortened Disability Periods for the Industrial Worker: DR. E. J. O'BRIEN, Surgical Director, Herman Kiefer Hospital, Detroit.

—Discussion.

Tuesday Morning, May 4, 1937

INDUSTRIAL HYGIENE ENGINEERING:

9:30—Appraisal of Exposures—Part 1: Chairman, JOHN M. HEPLER, Director, Bureau of Industrial Hygiene, Michigan Department of Health, Lansing.

—The Industrial Hygiene Survey: DR. CAREY P. MCCORD, Director, Bureau of Industrial Hygiene, Department of Health, Detroit.

—Industrial Hygiene Laboratories and Their Work: DR. WILLIAM G. FREDERICK, Assistant Chemical Engineer, Bureau of Industrial Hygiene, Department of Health, Detroit, and DR. GORDON C. HARROLD, Industrial Hygiene Laboratories, Chrysler Corporation, Detroit. (Demonstration Laboratory Equipment and Procedures).

—Discussion.

Tuesday Afternoon, May 4, 1937

2:00—Control of Exposures—Part 2: Chairman, PROFESSOR H. E. MILLER, Professor of Public Health Engineering, University of Michigan, Ann Arbor.

—Engineering Methods in Industrial Hygiene: DR. JOSEPH DALLAVALLE, P. A. Sanitary Engigineer, U. S. Public Health Service, Washington, D. C.

—The Industrial Breathing Zone: H. O. DANZ, Assistant Manager, Power Equipment Department, American Blower Corporation, Detroit.

—Eliminating Industrial Exposures by the Engineer: G. A. COBURN, Personnel Director, Delco-Remy Division, General Motors Corporation, Anderson, Indiana.

—Discussion.

Wednesday Morning, May 5, 1937

INDUSTRIAL DERMATOSES:

Chairman, DR. ARTHUR E. SCHILLER, Detroit Dermatological Society, Detroit.

9:30—Eczematous Dermatoses of Occupational Nature, with Special Reference to Proof of Occupational Origin: DR. MARION B. SULZBERGER, Associate Professor of Clinical Dermatology and Syphilology, Columbia University, New York City.

—Industrial Dermatoses in Relation to Com-

pensation: Dr. Robert C. Jamieson, Detroit Dermatological Society, Detroit.
—A System of Therapy for the Industrial Dermatological Case: Dr. Loren Shafer, Detroit Dermatological Society, Detroit.
—Discussion.

Wednesday Afternoon, May 5, 1937

OCCUPATIONAL DISEASES AND THE PRACTITIONER OF MEDICINE
Chairman, Dr. C. C. Slemons, Commissioner, Michigan Department of Health, Lansing.
2:00—The Medicolegal Trends in Occupational Diseases: Dr. C. O. Sappington, Consulting Industrial Hygienist, Chicago.
—Occupational Diseases and the General Practice of Medicine: Dr. Robert T. Legge, Professor of Hygiene, University of California, Berkeley, California.
—Panel Discussion of Occupational Diseases and Industrial Hygiene: Leader Dr. A. D. Lazenby, Chief Surgeon, Maryland Casualty Company, Baltimore, Maryland.
—Discussion: Ten outstanding persons in attendance including industrial physicians, engineers, public health officials and industrial hygienists will constitute a panel for the discussion of questions submitted in writing related to occupational diseases and industrial hygiene. Additional questions may be submitted from the floor and discussion by those in attendance will be invited.

The meetings on Monday and Tuesday will be held at the Statler Hotel; Wednesday's meeting at the Detroit Institute of Arts.

American Association

—Twenty-Second Annual Meeting—

—Program—

Thursday Morning, May 6, 1937

Chairman, Dr. Robert P. Knapp, President, American Association of Industrial Physicians and Surgeons:
—Business Meeting.
—Address of the President , Dr. Robert P. Knapp, Medical Director, Cheney Brothers, South Manchester, Connecticut.
—Solvents, Their Hazards, and Safe Practices in Industry: Dr. A. L. Brooks, Medical Director, Fisher Body Corporation, Detroit.
—Compensation for Occupational Diseases: Dr. James A. Britton, Medical Director, International Harvester Company, Chicago.

Thursday Afternoon, May 6, 1937

Chairman, Dr. R. R. Sayers, (President-Elect): Medical Officer in Charge, Industrial Hygiene & Sanitation, U. S. Public Health Service, Washington, D. C.
—Round Table on Industrial Hygiene, Dr. R. R. Sayers, Medical Officer in Charge, Industrial Hygiene and Sanitation, U .S. Public Health Service, Washington, D. C.

Thursday Evening, May 6, 1937 (Banquet)

Toastmaster and Chairman, Dr. Loyal A. Shoudy, Chief of Medical Service, Bethlehem Steel Company, Bethlehem, Pennsylvania.
—Address: Dr. Harry E. Mock, Associate Professor of Surgery, Northwestern University Medical School, Chicago.
—Address: C. F. Kettering, Vice-President in charge of Research, General Motors Corporation, Detroit.

Friday Morning, May 7, 1937

Chairman, Dr. McIver Woody, (Second Vice-President):
—Trends in Industrial Surgery: Dr. John J. Moorhead, New York City.
—Bronchogenic Carcinoma: Dr. Carlton B. Peirce, Associate Professor, Department of Roentgenology, University of Michigan, Ann Arbor.
—Medicolegal Aspects of Sudden Deaths in Industry: Dr. Plinn F. Morse, Director of Laboratories, Harper Hospital, Detroit.
—Economics and Ethics of Medicine: Dr. R. G. Leland, Director, Bureau of Medical Economics, American Medical Association, Chicago.

Friday Noon, May 7, 1937 (Luncheon)

Chairman, Dr. John J. Prendergast, Medical Director, Chrysler Corporation, Detroit:
—The members will be guests of the Chrysler Corporation and probably will be addressed by K. T. Keller, President of the Corporation, on some such subject as "The Value of Medicine to Industry."

Friday Afternoon, May 7, 1937

Chairman, Dr. Otto P. Geier, Cincinnati Milling Machine Company, Cincinnati, Ohio:
—Round Table of Industrial Medicine and Surgery: Dr. Otto P. Geier, Cincinnati Milling Machine Company, Cincinnati, Ohio.

Saturday Morning, May 8, 1937

—Members will be given transportation and opportunities to visit medical departments and laboratories in the various plants of Detroit.

THE Michigan Association of Industrial Physicians and Surgeons will join with the American Association of Industrial Physicians and Surgeons in these meetings.

And the headquarters, as to all meetings, will be at the Statler Hotel.

New York Central Surgeons

THE Association of Surgeons of the New York Central System will hold its 1937 annual meeting at the Hotel Cleveland, Cleveland, Ohio, on September 20, 21 and 22, 1937.

The program will be announced in a later issue.

Northwest Conference

MEDICAL problems involved in handling of injuries of industrial workers are of growing concern to both physicians and state officials. A Conference on handling common industrial injuries has accordingly been arranged between Industrial Commissions and leading physicians and surgeons from all parts of the country to be held in St. Paul, May 5, 1937, at the Municipal Auditorium.

The Conference, which will draw physicians interested in industrial medicine from all sections of the Northwest, will be held in connection with the 84th Annual Meeting of the Minnesota State Medical Association which will open May 3 at the Auditorium, and will be the first of its kind to be held under state medical society auspices.

The program is regarded of such importance by doctors that the Great Northern Railroad Surgeons have decided to make it the occasion of their Annual Meeting and will join with the State Medical Association in the Northwest Conference for the Wednesday meeting.

An Industrial Dinner on Tuesday evening, May 4, will officially open the program. Hon. Voyta Wrabetz, Madison, Chairman of the Wisconsin Industrial Commission, will be the dinner speaker. His subject will be "Prompt Reporting and Cooperation with Commissions." Members of the Minnesota Industrial Commission will be guests. Governor Elmer A. Benson, of Minnesota, will give the address of welcome, and Dr. A. W. Adson, Rochester, President of the Minnesota State Medical Association, will also speak.

Among the famous surgeons who will take part in the Wednesday program will be Dr. Maxwell J. Lick, of Erie, Pennsylvania, and Dr. Michael L. Mason, Chicago.

Dr. Lick, president of the Medical Society of the State of Pennsylvania, will speak on "Differential Diagnosis in Acute Abdominal Tragedies." He is Surgeon for the New York Central and Nickel Plate Railroads, and is also Surgeon at St. Vincent's hospital and Urologic Surgeon at Hamot hospital, Erie.

Dr. Mason will discuss "Pitfalls in the Management of Hand Infections." Dr. Mason is Associate Professor of Surgery at Northwestern University School of Medicine and Attending Surgeon at Passavant Memorial hospital. He has contributed several articles on hand injuries and other industrial injuries to scientific journals.

F. T. Starkey, St. Paul, Chairman of the Minnesota Industrial Commission, will give the address of welcome on Wednesday, opening the day's program.

Speakers will discuss many of the injuries which often present difficulties in restoration of function and return of the patient to work. Minnesota speakers and their subjects include the following:

Dr. J. R. Kuth, Duluth, "Back Injuries"; Dr. W. McK. Craig, Rochester, "Neglected Head Injuries"; Dr. H. W. Meyerding, Rochester, "Fracture Dislocation of the Shoulder"; Dr. Wallace Cole, St. Paul, "Hand and Wrist Injuries"; Dr. B. S. Adams, Hibbing, "Injuries to the Thigh"; Dr. H. B. Macey, Rochester, "New Automobiles and New Fractures"; Dr. A. A. Zierold, Minneapolis, "Peripheral Nerve Injuries"; Dr. R. F. McGandy, Minneapolis, "Review of the Treatment of Burns"; Dr. C. C. Chatterton, St. Paul, "Certain Derangements of Knee Joint"; Dr. O. W. Yoerg, Minneapolis, "Treatment of Os Calcis Fractures"; Dr. F. H. Krusen, Rochester, "Physical Therapy in Relation to Industrial Medicine."

A Question Panel on industrial medicine will close the program with Dr. A. W. Adson, presiding.

The Conference will be only one of many important features of the Annual Meeting. In addition to the scientific program arranged for Monday and Tuesday, there will also be a Congress of Allied Professions on Monday when representatives of the various professions allied for the care of the sick, will discuss common social and economic problems. A public health meeting is scheduled for Tuesday night. Clinics will open the program Monday and Tuesday and there will also be a symposium on medical economics, and two hours of program time each day will be devoted to scientific demonstrations and inspection of exhibits.

Association for Advancement

THE Association for the Advancement of Industrial Medicine and Surgery held a Scientific Meeting at the Manhattan Club, New York City, on the evening of Wednesday March 10, 1937.

Following dinner, there was a Symposium on Osteo-Arthritis, including the following:

1. Traumatic Osteo-Arthritis, by Dr. Russell H. Patterson;
2. X-Ray Findings, by Dr. Maurice M. Pomeranz;
3. The Pathology, by Dr. Henry L. Jaffee;
4. Physio-Therapy, by Dr. William Bierman.

The discussion was led by Dr. Willis W. Lasher, and Dr. J. J. Masterson, Dr. V. DePaul Currence, Dr. Hartung, and Dr. Rafael Lewy, Chief Medical Examiner for the New York State Labor Department, participated.

Among the visitors from out of town was Dr. O. A. Brenenstuhl, of Albany; and Henry B. Sayre, former Industrial Commissioner, and Commissioner Lowe of the Federal Commission, were among the lay members interested in this subject who attended the meeting.

Human Hazards in Industry

—and Their Remedy—

M. E. Fulk, M.D.,
Zanesville, Ohio

ONE of the biggest problems with which industry is confronted has to do with the prevention of accidents.

There are two major aspects:

First, the industry, in order to be safe, must be adequately provided with all known protective devices and necessary safeguards.

Second, each worker in the industry must himself work safely, according to his predetermined physical and mental qualifications.

At no time in history has there been such a great need for a definite understanding of the human factors of industry as today.

We know there are countless hazards in industry. What is their nature?

They are physical, psychological and physiological. Some depend upon the working place. Some depend upon the mind of the worker, and some upon his health. It is with the last two phases that I shall deal—the worker's mind and his health.

Who shall be admitted to industry if safety for themselves and others is to be attained? We know that some workers, far too many in number, are repeaters in accidents. Why?

Is this due to bad health connected with functional disturbances?

We all can agree to the fact that industry is divided into two main parts, namely, the machine or mechanics, the man-power or humanics. I shall not here discuss the safeguards incident to the machine; we are now dealing primarily and principally with humanics, or the human phase.

However, it would be grossly unfair to pass without giving due credit to the thoughtful and active exponents of mechanical safety. For, indeed, much time and money have been wisely and profitably expended in the well known Safety First movement. And it is true that countless accidents have been prevented and much sickness avoided. In short, the benefits to industry and society as a whole have been manifold, and cannot be estimated in dollars and cents.

But in spite of all that has been done to date, hazards continue to exist; accidents still occur, and sickness prevails in greater or lesser degree. Reliable statistics extending over a period of years reveal that while the morbidity rate has been decreased we still have in our midst a constant number of accidents in industry. Yet they can be largely eliminated.

Recently Dr. M. N. Newquist, of Chicago, presented a striking report on "A Three-Year Survey of Medicine and Surgery in Industry." He stated in effect that there were 25,000 fatalities and 3,000,000 lost-times injuries annually as a result of major industrial accidents in the United States. He further stated that there are 87,000,000 minor accidents from the same cause. And, on figures from the U. S. Bureau of Labor Statistics, U. S. Department of Labor, Dr. Newquist revealed that the total cost of industrial injuries in the United States annually is $5,000,000,000!

Admittedly, there are many accidents and resultant injuries for which figures are not available, which bring the monetary loss to a greater sum than that.

THIS enormous industrial cost, or loss, can be materially reduced.

Let me give a graphic illustration: Today, most large industries scientifically select the best talent available to man their purchasing departments. And they depend upon these experts to buy machinery and equipment that will result in maximum output of product at minimum cost. Moreover, when installed, these machines and items of equipment are constantly watched, checked, charted and analyzed, from the standpoint of economy as it relates to mass production; and they are repaired at the first moment they show signs of not producing to their maximum efficiency capacity, other things equal.

But whom do we choose to buy our man-power?

Unfortunately, the average industry has not applied the same rationality and efficiency methods in the purchase of its man-power, which admittedly is of equal or even greater importance.

It is certain that the employers of labor alone are directly responsible for the appalling number of industrial accidents and deaths costing industry and the nation $5,000,000,000 annually. How many of you are included in the list? What precautions are you taking to reduce industrial accidents, deaths, and resultant losses? These are vital questions, and none can escape the consequences.

You doubtless know that in normal times it was the accepted fact among industrialists that the wages paid the employees of any given plant over a period of four years would equal the cost of the plant itself!

In lean times however, and as a result of irregular work, the cost of man-power materially increases. Let me illustrate: In connection with a large construction plant it was recently noted that a large number of accidents happened on Monday morning, especially between the hours of 10 and 12. In fact there were more accidents on Monday than any other three or four days of the week combined. Close check-ups with other and varied industries often revealed the same experience.

Our conclusions were that the men left their work Saturday at noon and did not keep up their normal exercise over the week-end. Some of the men drank and otherwise dissipated, while others were careless about their eating. If this is true of short periods, what would be the consequences of prolonged lay-off?

We find in all men certain underlying physiological conditions to which their mental condition responds. Or, to state it more clearly, these mental or psychological conditions have physical causes. One does not have to yield invariably to these physical disturbances. But while they are operating, certain normal functions are held in abeyance.

Briefly speaking, all men are natural hazards; that is they are by nature predisposed at times to invite accidents by their actions. Perhaps it would be better to qualify that statement by saying that all men *may* be hazards, of varying and different degrees.

The conception that men in general have a tendency to accept these hazards, stirs up in one's mind a desire for a practical system of measurement to grade these hazardous impulses in such a manner as effectively to reduce accidents.

All of this leads up to a solution of the problem which I mentioned in the beginning.

The solution is this: the *correct* industrial physical and mental examination clearly indicates the type of work for which the worker is best fitted. Men are not alike in physical or mental makeup. What one can do, another cannot. What one will do, another will not do.

So, the successful employer always applies the following dependable rule: Can the individual do the work required of him?

Therefore, while we must always regard the individual as a living whole, we should also consider the anatomical, etiological, social and mental dimensions. Our yardstick should be the physiological—the delicate measurement of each and every one of the bodily organs as they relate to the functions subserved. The result will be a grade or classification that will insure proper placement of the worker.

However, it was not until the advent of the compensation laws that industry even began to realize the value of placing a worker properly and keeping him in efficient running order—in good health. For that matter, no one could expect to be kept in good running order while toiling at a job for which he is physically unfit, in greater or lesser degree. At the same time others may be engaged at jobs much below their physical ability. Obviously, such conditions denote unsound judgment on the part of the employer and result in improper placement of the worker. It must be borne in mind that the improperly placed worker almost invari-

ably is discontented and unhealthy—a liability rather than an asset.

Furthermore, countless thousands of men and women, through no fault of their own, are deprived of the opportunity of demonstrating their *real* producing ability, simply because they are placed at jobs below or beyond their physical capacity, usually the latter. Such workers inevitably suffer, not only impairment of health, but impairment of courage, self-respect, and even moral fibre as well.

It is conservatively estimated that the annual economic loss to the nation from this source alone is approximately one billion dollars. But still the loss cannot be estimated in dollars and cents; it has a far greater significance than that!

While we try to review the present situation from the physician's point of view, I can think of nothing more essential than a modern standard for grading individual industrial workers according to their physical and mental qualifications.

As I have previously stated, industry is made up chiefly of men and machines. Of these, man deserves the first and foremost consideration. Up until now industry has been so busy perfecting the organization and direction of mechanical factors in order to meet competition, that the human factor has received scant attention.

But according to the late Thomas A. Edison: "A new day has dawned. Problems in human engineering during the coming years, will receive the same genius and attention which the nineteenth century gave to material forms of engineering."

THAT a direct relationship exists between injury and physical efficiency is so obvious to a physician that the argument needs hardly to be pressed. When we consider that we are less than 200 years removed from the time when we were a hunting and food-gathering people, one can begin to grasp something of the adaptation which modern man has undergone.

Industrial preparedness requires that a worker be constantly maintained at the highest point of his efficiency. This is done by adequately guarding his life, his health and his happiness—a hundred times more than the finest machines which he operates and guards against breakdown!

Why?

Because industrial breakdown will never come from purely mechanical causes.

It is being demonstrated more clearly and forcibly each day, that in spite of our many labor-saving devices, the factors that threaten the security upon which industry rests are by far more human than material or mechanical.

Under modern industrial conditions the worker must, above all, possess:

A good nervous system;
Heart and blood vessels without serious defects;
Good lungs;
Good feet;
Strong inguinal muscles and fascia;
Strong bones and ligaments;
Well functioning joints;
Keen sense organs;
Freedom from organic disease.

Otherwise he is physically unfit. And a worker who is physically unfit is more or less mentally unfit; he finds it increasingly difficult to concentrate upon his work. It is putting it mildly to state that a worker who cannot or does not keep his mind on his work is a sure-fire risk, capable of inviting almost any kind of disaster. Perhaps that is why these unfortunates are generally known and referred to as "walking hazards"—a good term.

The main human qualities automatically and inseparably associated with safety and synonymous with good health, are:

To be: Alive,
Alert,
Careful,
Level headed,
Observing,
Considerate,
Attentive,
Resourceful.

Physical disorders may and often do quicken the mind toward destructive activity, or may depress it into sluggishness; and in many cases these disorders interfere with the worker's vitality to such a degree as to destroy or seriously impair his normal or potential capacity to secure protection against accident or disease.

Since statistics are of little value unless they can be proved conclusively, I shall now give you some practical results of a 10-year survey, which are principally from my own carefully recorded experiences and observations, if I may be pardoned for the reference. The findings of this survey deal conclusively with nearly 10,000 accident cases, each directly involving individual disability of more than a week's duration. Most of the accidents occurred in connection with construction work.

Here are the results: Sixty-nine per cent of the men affected by the accidents showed symptoms of physical deficiency of one kind or another and extending over a period of years prior to injury. Among the physical deficiencies found, were:

Hernias;
Gastric and duodenal ulcers;
Defective vision and hearing;
Heart and lung disabilities;
Kidney lesions;
Venereal diseases;
Abnormal blood pressure;
Mental disorders;
Infected teeth and tonsils; and other disabilities.

However, infected teeth with resultant complications, such as enlarged and diseased hearts, anemia, kidney disorders, liver diseases, etc., were responsible for approximately 64% of the disabilities.

A very close individual study was made of these men. It was pertinent to know their past as well as their present, and also to ascertain how they felt about the causes of the accidents in which they respectively were involved. With the exception of very few, they each frankly admitted (when assured that their admission would not affect their jobs or compensation) that had they been in good health the accidents for the most part could and would have been prevented.

With reference to the large percentage of these men having infected teeth, it might be interesting to note here that Dr. Charles Mayo, of Rochester, Minnesota, recently made the statement that 79% of all deaths outside of tuberculosis, acute infectious diseases, cancers, and accidents, are due to infections resulting mostly from bad teeth, tonsils, and piles.

Almost 13%—12.89%, to be exact—of the work-

ers reporting after accidents apparently were normal physically before being injured. However, careful examination and investigation proved without doubt that the great majority of these accidents occurred through the carelessness of *other* men physically below par. Judging by this compilation it is clear that for their own protection employers must assume the offensive by keeping their workers in the best condition possible.

THE pre-employment and periodical examination appreciably widens the worker's margin of safety, in that it brings to light any indication of physical impairment of whatsoever nature, which may and can be corrected without occupational interruption.

Over a period of years, various industrial physicians have recorded observations of many injuries which under normal circumstances might not have happened; or, at least they would not have resulted in more than brief disability. But, instead—because of serious complications of some former diseased condition—the injured man was incapacitated for a considerable period of time.

A minor injury to a toe of an employee afflicted with diabetes may produce ulceration, which will take weeks to heal. It may even cause gangrene, and necessitate amputation of the foot or leg.

An injury to the joint, which might ordinarily be expected to disable one for only a short period of time, in those individuals suffering from one of many diseases, may develop into a serious, long-continued deformity, and possibly cripple the individual for life.

In one instance a carpenter, with no pre-employment examination, injured his right shin bone. Immediate treatment was rendered. In about 10 days the wound apparently had healed and the man returned to work. Later, to the plant superintendent, his case records revealed symptoms of syphilis. A request was made to give him the usual treatment, and also allow him to continue limited work. However, the superintendent, against the advice of the physician, immediately discharged the employee.

He left the community with a revengeful spirit, dissipated, intentionally re-injured his leg, and then sought medical advice and care elsewhere. He gradually became worse. The doctors tending him were forced to amputate his leg at the knee, and later at the hip. Finally, five and one-half years later, they signed his death certificate. I need hardly say that this case cost the State Industrial Commission nearly $13,000.

Of course, such results tend needlessly to raise the employer's insurance rates, until finally he is forced out of business. Tactfulness on the part of the employer and skill on the part of the surgeon in such cases as I have enumerated can save considerable money for the employer and untold suffering for the worker.

Injury often reveals individual capacity for physical resistance. Let me illustrate: A tall and underweight mechanic, in the act of rising from a bending position, struck his back against a gas engine. Four days later he reported for treatment. Examination revealed no scar, but slight indications of contusion. The x-ray revealed a small fracture of the tip of the ninth thoracic vertebrae. He immediately entered the hospital and was given the usual treatment. After a period of two weeks he developed active tuberculosis of the lungs, which later involved the injured vertebrae. He admitted that physicians had previously warned him against a suspicious case of tuberculosis. In spite of the best treatment rendered, the case developed into a permanent disability. Here is a case of pulmonary tuberculosis. Compensation laws provide that the employer is not only liable for any injury which aggravates a pre-existing physical impairment, but also all complications arising in and out of the employment of his workers.

An expert bandsaw operator came into the hospital one day with three fingers sawed off. A study of his past showed frequent finger injuries in the same manner. An examination of his eyes revealed shortsightedness. Had his eyes been fitted with proper glasses prior to the accident, it certainly should never have happened.

One worker was suffering from impaired hearing and thus failed to receive his companion's warning as they were unloading pipe. This impairment cost the worker one of his legs, which was so badly broken and mangled it had to be amputated.

In one State, not so long ago, there was a worker who was known to his associates as mentally "off" at times. One day he lighted a cigarette which ignited gas, causing an explosion. This untimely accident killed seven men outright, injured several others, and destroyed much valuable property.

I could go on endlessly giving examples of men injured because of their own physical disabilities; or, the innocent and unsuspecting being injured by their fellow workers who were not physically and mentally qualified for their jobs.

I know of no better way to explain the benefits of physical examinations with corrective measures than to cite a case of my own experience. My services had been employed by a large coal mine operator. During the preceding six years this concern had suffered many accidents and cases of sickness. These resulted in considerable lost time and labor turnover. The company's industrial insurance rates had mounted from $5 to almost $14 per hundred. I made pre-employment examinations and check-ups on 39% of their men. During the first 11 months, only one of the men who had been examined met with an accident, and he was one who had been cited for teeth extractions and medical care before going to work, or to have immediate care if he did go to work. But the orders were not carried out.

On the other hand, accidents occurred at the same ratio as previously among the men who did not have the examinations with check-ups. However, both groups of men were working under identically the same conditions.

At the beginning of the second year I examined 80% of the men in this mine. True, there were some accidents as may be expected in any coal mine. But all the men fully recovered in the usual time for such injuries, and all were on the payroll at the end of the year. These men continued in the best physical condition. Such men as these seldom meet with accidents and rarely lose any time. In addition, they are by far more efficient and dependable than men with impaired health. The statements and figures I have used can be verified by any who may be interested.

I could go on giving additional concrete examples of how well advised examinations, properly

administered, can and do prevent accidents and occupational diseases. But suffice to cite one further case which is typical of the experiences of any average industrial physician:

SOME few years ago a large industrial concern designated a group of 100 men who were willing to undergo the severest examinations and cooperate in every way possible toward having their respective impairments, if any, corrected. It will be interesting to note that at the end of the first five-year period following the experiment, the company reported, with a great deal of genuine satisfaction, that these men had increased their efficiency exactly 23%, while at the same time stepping up the potential assets of the company by nearly 37%!

Most types of industry are rapidly becoming technologized; more mechanical processes. The result is a constant pressure for economy in product; especially is this true in the use of labor. In such situations the application of an *improved selective* quality in the purchase of labor admittedly is a necessary adjunct. Safety begins and endures only when the greatest care is exercised in the selection and maintenance of workers toward proper placement, and other considerations.

We cannot expect 100% efficient machines constantly to produce to 100% capacity when operated by men who are only 50% efficient.

Thus we may readily see that it is primarily and by far more important to establish and maintain health-safety standards for workers, than it is to seek first to keep the machines of industry in perfect order. In other words, "Take care of the workers and they will take care of the machines"—seems apropos.

Our safety first men teach us that "safeguarding machines is safeguarding men." True enough in a sense. Again, and all credit to the thoughtful exponents of safety. But why not first safeguard the workers and let them safeguard the machines, and thereby produce more abundantly with greater economy?

And so, it would seem from the evidence submitted that the lax employer of labor—and unquestionably there are many of them—would voluntarily begin to protect himself, and likewise his workers, against further and unnecessary human hazards, consequent costs of compensation, unemployment, and loss.

Certain it is that the biggest problem of industry will not have been solved unless and until employers generally show at least as much, if not more, consideration toward the human phase of industry as has been accorded the mechanical side in the tragic past.

The appalling number of unnecessary accidents each year—due to a lack of health-safety measures—bears grim witness to the fact that all lax industry is perilously close to further and forced governmental regulation. Whether such regulation would be acceptable is entirely beside the point. Suffice to say that something must and will be done when the problem reaches the saturation point.

And it is true that an increasingly-enlightened, health-minded public—aided by ever broadening, readily accessible educational facilities—is fast and surely learning of the vast and far-reaching economic benefits that inevitably will accrue to the nation as a whole, through the adoption by industry of sane health-safety regulatory measures, whatever be their source. Naturally, all interests will be best served if industry will voluntarily take the lead in adopting these measures.

BUT in taking this forward step industry must realize that, as in the analysis and acceptance of machines, time, patience and adequate facilities are required to make a real physical examination, one that will reveal true functional values and clearly indicate proper placement of the desired man-power. Furthermore, capable, well selected physicians should be in constant touch with the man-power, as the employer is in constant touch with the machine. In the past, well-meaning physicians generally have not received their just due. And, unfortunately for industry and the medical profession, some inefficient physicians today are occupying places of trust and thereby tending to reflect upon the well earned records and standards which the higher types of industrial physicians have established and seek to keep inviolate. Further to emphasize an important point: *Real efficiency can neither be achieved nor maintained in any industrial plant until the human and mechanical safety factors have been duly coordinated by the most reliable experts available.*

Again, the selection of industrial health-safety engineers is doubly important. They should not only be capable and trustworthy, but also certified as such both by experience and reputation.

All of these provisions are timely, because in the forces of the human body there is always decline and decay. From hour to hour, beginning at the age of 12, the human body is constantly losing its heat and elasticity, its spring and power. But only as we digest all this can we perceive the great importance and potential benefits of industrial medicine. The work of the *human* safety engineer is to regulate this struggle upon equitable principles and in the interest of the greatest number.

The truth of the matter is, so long as primitive instincts of human nature continue to exist, human formulas of whatever sort—social, political, or industrial—are apt to be imperfect, because human nature is imperfect.

But there is one thing we do know with a degree of certainty about humanics. It is this: The safe worker is the one who follows the order of Nature and keeps his life continually adjusted to surrounding conditions. As conditions change, he must change, and the sooner the readjustment comes the less susceptible will he be to danger. Man-power depends not only upon vim, vigor, good health and vitality, but also upon sound judgment, common sense, and self-control.

Therefore, science and technology demand a standard health program for the employee—a uniform plan of procedure for the human side of industry as well as the mechanical. No one is going to doubt the wisdom of such a plan, because it instantly provides acceptable ways and means of adequately measuring and testing the prime ability and potential capacity output of the nation's workers according to common specifications.

And so, all of the foregoing evidence brings us to the sound conclusion that we should frankly recognize the importance of applying the study of man to the study of man's safety from the standpoint of his health and well being. We owe it to ourselves and to posterity that it shall not be said of us that we created the gigantic power machine

of the Twentieth century and yet made a miserable failure in safeguarding our workers through the application of modern health principles.

And as I seek to draw aside the veil and gaze into the great hall of the future, I see the time when the worker shall live to enjoy the fruits of his labor; his mother shall have the comforts of his arm in her age; his wife shall not be untimely a widow; his children shall have a father; and the cripples and helpless wrecks who once were strong men, shall no longer be a by-product of industry.

That is the picture, the problem and the remedy!

Cerebral Arteriosclerosis

— *in Railroad Employees* —

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Atlanta, Georgia

FULL control of one's mental facilities is an essential for those in railroad employ.* It is also extremely important that individuals in this vocation shall be free from the hazard of sudden vascular accidents.

Cerebral arteriosclerosis is a widespread disorder in those over 40 years of age. It may be an expression of a generalized vascular disease, or it may be purely a localized process. The etiologic factors are as obscure as those of generalized arteriosclerosis. Heredity is probably the most important single factor. Chronic hyperadrenalemia, nicotine, alcohol and other intoxicants are blamed by many as being causative factors.

The symptoms of cerebral arteriosclerosis are as numerous as the vessels that supply the central nerve system. The manifestations of the disease depend entirely on the areas of the brain that are affected by the impaired blood flow, resulting from arteriosclerosis. The onset of symptoms may be sudden or insidious. The sudden onset of symptoms is usually associated with vessel rupture, thrombosis or vessel spasm, while the more gradual onset occurs in those individuals with degenerative processes resulting from a slowly decreasing blood supply to the affected areas.

From the standpoint of the railroad employee, the acute or sudden onset of symptoms is by far the greater industrial hazard. Its prevention can be accomplished only by rigid periodic examination of those holding positions of great responsibility.

Physical examination of these individuals should comprise a careful survey of the entire peripheral vascular tree, palpation of all the superficial arteries, a detailed eye-ground study; careful heart examination and a study of renal function; a neurologic examination of the psyche, the cranial nerves, tendon and superficial reflexes, coordination tests and sensory disturbances.

In eliciting the history, such symptoms as headache, insomnia, drowsiness, emotional instability, irritability, memory change, confusion states and sensory disturbances, such as numbness and tingling, should be sought for.

An outline of the syndromes that may be encountered in patients with cerebral arteriosclerosis should be considered:

1. That due to disturbance of the twig or terminal branches of the vessels supplying the cortex, the medulla or both.

2. Lesions due to involvement of the main cerebral vessels:

(a) Anterior cerebral artery, crural palsies.

(b) Middle cerebral artery: (1) Monoplegias, combined palsies or complete palsies; (2) Aphasias; (3) Hemianopsias.

(c) Posterior cerebral artery visual disturbances and coordination.

(d) Disorders of large trunks from obliterating lesions, basilar syndromes.

Vascular crises or spasms are industrially important, for they may occur in indiviuals who show relatively little from physical examination, and, as in the more permanent lesions, they may involve any area of the brain and its related function. These spasms may be sufficiently extensive to produce complete transient plegias or interference with the cortical functions of memory, intelligence, vision, speech, etc. A sudden accident of this sort might indeed be tragic in a railroad engineer or any other employee with an equally responsible position. Recovery from the spasm state is usually rapid and most often complete, but the probability of a recurrence is ever present.

Cerebral arteriosclerosis is different from this pathologic process occurring in other parts of the body, in that it not infrequently gives rise to miliary aneurism formation. These small outpouchings will occasionally rupture to produce a fatal cerebral hemorrhage, or, by very size and location, exert pressure on some important fibre tract or nucleus and produce changes in the functions of the central nervous system. Unfortunately one detects very little on physical examination in these individuals until the fatal accident occurs. Occasionally these little aneurisms are found in individuals under 40 years of age and whose general vascular tree is apparently in good condition.

The differential diagnosis of cerebral arteriosclerosis includes almost every disease that may involve the central nerve system. From point of view of the railroad its differentiation from intracranial injury is important, and often exceedingly difficult. Cerebral concussion or obscure skull fracture in an individual over 40 years of age may be accentuated in its gravity by the presence of arteriosclerosis and any involvement of the central nervous system might result therefrom. On the other hand, a cerebral arteriosclerotic railroad employee might be uninjured in an accident and with the help of a clever lawyer have the railroad adjudged responsible for a permanent total disability. This aspect of differential diagnosis is probably more important from the standpoint of the passenger than the employee.

Early manifestations of brain tumors and cerebral arteriosclerosis are often indistinguishable and require the most detailed neurologic study and often a period of observation to satisfactorily determine the correct diagnosis.

Syphilis of the central nervous system is often associated with arteriosclerosis and is extremely difficult to differentiate; this applies not only to paresis but also to meningo-vascular lues. Again careful examination with spinal puncture and serologic examinations will reveal the true story.

Encephalitis, multiple sclerosis, Parkinson's disease, and the various organic psychoses may be simulated by arteriosclerotic manifestations.

* Presented at the Annual Meeting of the Surgical Association of the Atlanta & West Point Railroad, the Western Railway of Alabama, and the Georgia Railroad, at Atlanta, Georgia, March 30, 1937.

THE treatment of cerebral arteriosclerosis is usually disappointing. So often it is the end chapter of a long series of events. Frequent examination and removal of the possible etiologic factors is then of more avail than actual treatment of the fully developed disease.

Occasionally, however, one encounters small focal lesions that heal completely, leave the patient entirely free of impairment, and do not recur for many years. Management of these types is of course more encouraging, but is still clouded by the ever-present probability of recurrence. Correction of faulty diet habits, removal of focal infection, rest, physiotherapy, re-education of lost senses and motor function remain the principal avenues of therapy in these with chronic changes and insidious onsets.

In the acute cerebral accidents the patient must be left completely quiet; opiates should be used with caution, as we will so often find some depression of the vital center from the accident. Spinal punctures are indicated if there are signs of continued hemorrhage or increased intracranial pressure that cannot be controlled by intravenous glucose (50% solution) or saline laxatives. Rapidly rising fever is usually an ominous sign in one with a recent cerebral accident, but we must not overlook the possibility of dehydration in the production of this elevated temperature. The maintenance of adequate nutrition often has to be accomplished with the Levine tube, and this should be used without hesitancy.

In the cerebral vessel spasm attack vasodilators are usually of value, and the correction of focal infections, removal of intoxicants and the stabilization of fluctuating blood pressure will often aid materially.

In conclusion it must be said that cerebral arteriosclerosis is a grave disease for anyone, but is extremely malicious in railroad employees, especially those having important positions in the actual business of transporting passengers or goods.

As to those employees who have suffered a vascular accident and recovered, or those who have only mild symptomatology from the disease, the railroad should place them in positions of minor responsibility for the remainder of their working days.

Hand and Foot Fractures

—Incidence Over a Five-Year Period—

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and
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A FRACTURE of a smaller bone in the hand and foot may be followed by as great a disability as one following a fracture of a larger bone.* The number of permanent injuries could be materially reduced if the doctor entrusted with the management of these fractures would follow the approved methods for their treatment. In the following discussion there will be presented a brief report of the incidence of fractures of the hand and foot observed at the Duke Hospital over a five-year period and the most widely used methods of treatment.

* From data presented at the 1935 Annual Meeting of the Association of Surgeons of the Southern Railway System, by invitation in a Fracture Symposium.

Fractures of the Hand

THERE were 63 fractures of the hand observed in 56 patients. This is an incidence of 6.2%; and 15% of this number were in the carpals, 37% in the metacarpals, and 48% in the fingers. The scaphoid fractures were the most common one in the carpus. The fractures of the metacarpus were about evenly divided between the five metacarpal bones. The private and ward cases numbered about the same. But there were more compound fractures observed in the ward patients. As in most fractures the age incidence was higher in those active periods of life between 10th and 40th years. There were three times as many males as females.

The Carpus

BEFORE the general use of roentgen rays there were many undiagnosed fractures in the wrist. These injured wrists were called sprains. Unfortunately this practice of calling injured wrists sprains is still prevalent, and many cases are not correctly diagnosed until months after the original injury when it is too late to insure a good functional result by proper treatment. The most common injuries to the carpus are fractures of the scaphoid and dislocations of the semilunar bones. The injuries to the other carpal bones are uncommon and relatively unimportant. The mechanism of injury is usually hyperextension of the wrist from a fall on the outstretched hand. This same type of injury may cause a Colles' fracture or a dislocation of the semilunar. Occasionally direct violence may cause the injury.

	No.	Percent	Percent of Total Fractures
HAND	63		6.2
Carpus	9	15	
Metacarpus	23	37	
Phalanges	31	48	
		100	

	No.	Percent	Percent of Total Fractures
FOOT	54		4.5
Tarsus	28	52	
Metatarsus	11	20	
Phalanges	15	28	
		100	

Incidence of Fractures of the Hand and Foot at the Duke Hospital Over a Five-Year Period

The scaphoid is more often fractured through the neck, but occasionally the tuberosity may be broken. There is seldom a displacement of the fragments. The healing of this cancellous bone fracture is notably slow, due to the poor circulation. Delayed union and non-union are rather common sequelae. This is manifested on use by weakness and pain in the wrist. The diagnosis of the acute case is not difficult. There is a moderate amount of swelling and tenderness over the dorsum of the bone and in the anatomical snuff box which is usually obliterated. Abduction and hyperextension of the wrist give pain in these tender areas.

Fractures of the scaphoid should be immobilized in plaster early in a position of dorsiflexion

with the thumb incorporated as far as the phalangeal joint. It is advisable to apply the plaster as nearly skin tight as possible to prevent motion. This rigid immobilization should be maintained for a period of from six to 12 weeks. If the fracture is treated with this method from the beginning, the possibility for a solid union is excellent. Unfortunately, most of the scaphoid fractures are not treated in this manner. Some wrists have surprisingly good functional results even though there is an un-united fracture. The only indication for further treatment of the old case is pain and weakness. There have been three operative procedures described for the un-united fracture of the scaphoid: (1) one or both fragments may be removed; if only one fragment, this is preferably the proximal one; (2) a small bone graft may be placed across the fracture line, which may be sufficient stimulus to cause a union; (3) drilling holes across the fracture line will very often open up channels in which new circulation will be established, followed by new bone formation and solid union.

A dislocation of the semilunar bone without fracture is the next most common injury to the carpus. With hyperextension of the wrist the os magnum is pressed back against the posterior surface of the semilunar. The anterior volar ligaments are ruptured, and the semilunar is displaced forward. This is frequently accompanied by an injury to the median nerve, resulting in anesthesia and weakness in the part of the hand supplied by this nerve. There is always a prominence on the anterior surface with a partial loss of flexion and extension of the wrist. Frequently, this dislocation is associated with a fracture of the scaphoid. If the condition is recognized early, a closed reduction should be attempted. This is done by first hyperextending the wrist, applying pressure over the bone anteriorly, and then gradually flexing the wrist. If the early dislocation cannot be reduced by a closed procedure, an open reduction is indicated. In the old dislocation, it is usually best to excise the bone. With an accompanying scaphoid fracture it is sometimes advisable to remove both fragments of the scaphoid as well as the semilunar.

Occasionally following a dislocated semilunar bone a rarefying osteitis occurs which is called Kienbock's disease. The same condition may take place in the scaphoid and is called Preiser's disease. The involved bone appears dark in the roentgengram, while the surrounding bones appear light.

The Metacarpus

NEXT to the fractures of the fingers the metacarpal fractures are the most common ones of the hand. They may occur as a result of direct violence or crushing injuries. A fracture immediately proximal to the head of the metacarpal bone is slightly more common than one in the shaft. This is very common in pugilists, and is called a "prize fighter's knuckle." The 4th and 5th knuckles are more commonly injured. In the "prize fighter's knuckle" there is a dorsal buckling, the fracture is impacted, the head is tilted into the palm, and there is a complete loss of the normal prominence of the knuckle. These fractures are always accompanied with pain, swelling, and ecchymosis.

When the shaft is broken the angulation is usually posterior. Abnormal mobility can be elicited if the fracture is complete and in the shaft. Pulling on the affected finger will always elicit pain at the site of the fracture.

The first metacarpal bone is most often fractured at its base. This may be either a complete fracture or a so-called "stave of the thumb" (Bennett's fracture). In the latter the fracture is oblique from above downward into the carpo-metacarpal joint on the side of the second metacarpal bone.

The metacarpal fractures without displacement may be treated with a simple anterior splint. Those at the base of the thumb, however, should be immobilized in plaster with the thumb in full abduction. Without much displacement a fracture of the shaft may be satisfactorily treated with a roll of bandage in the palm or on one of the special "ball" metacarpal splints. Occasionally it is necessary to apply traction to the finger to correct the deformity and hold the fragments in normal alignment. This can be done most effectively by elastic traction to a wire or a needle through the terminal phalanx, and attached to a banjo splint. Three to four weeks is necessary for sufficient callous to form before this dressing should be removed. Adhesive traction or a basketweave splint on the finger sometimes is satisfactory. The objections to these are (1) the necessity for constant adjustment, (2) the extreme discomfort at times, and (3) the danger of circulatory disturbances at the ends of the fingers.

The complication of fibrosis through the joints of the hand should be guarded against. This is best prevented by early active motion. The so-called "frozen hand" is not always avoidable following extensive injuries to the hand, but its degree can be lessened with proper treatment.

The Phalanges

THESE are the most frequent of the fractures of the hand and are the most poorly treated of all the fractures in the body. They are most often caused by a direct blow over or on the end of the finger. Often there is a chip fracture into one of the articular surfaces of the phalangeal joints. Athletic injuries from football, boxing, and basketball account for a great many of these fractures. When the shaft of the phalanx is broken there is most frequently an anterior bowing at the site of the fracture as contrasted to a posterior bowing of the shaft of the metacarpal bone. The so-called "baseball finger" or "mallet finger" is very commonly observed. This is an avulsion of the extensor tendon from its insertion into the proximal end of the terminal phalanx, and most frequently a small fragment of bone is torn loose with the tendon. The results of treatment are not always satisfactory, as often there is a complete loss of use of the terminal phalanx.

A phalangeal fracture is best treated by immobilization of the finger on an anterior splint. Occasionally it may be necessary to apply skeletal traction to the terminal phalanx if there is an angulation and overriding which cannot be corrected otherwise. At times a very satisfactory form of traction can be obtained by boring a small hole through the fingernail and using this as a point for the pull on the finger. Compound wounds are most frequently associated with fractures of the terminal phalanx. Osteomyelitis is a common complication, and frequently an ampu-

tation of the part of the finger is necessary to secure healing. This is to be advised early in gross crushing injuries to the terminal phalanges.

Fractures of the Foot

FRACTURES of the foot form a most important group of fractures in industry, for it has been rightly said that an injury to the foot is a greater disability than to almost any other part of the the body, for when the means of locomotion has been interferred with the worker has to stop, no matter what his vocation is.

In the series of patients observed in the Duke Hospital there were 54 fractures of the foot observed in 40 patients, or an incidence of 4.5% of all the fractures observed in the five-year period; 52% of the fractures involved the tarsal bones, and in these the os calcis and astragalus were most commonly affected; 20% were in the metatarsals, and 28% in the toes. The age incidence was distinctly higher in the most active periods of life between the 10th and 40th years. The males were twice as often injured as the females.

It is interesting to note that all of the compound injuries were in the ward patients, these being in approximately one-third of the ward group. All of the ward patients were injured as a result of automobile and industrial accidents. The private patients were more often injured in athletics or as a result of the turning of ankles, and stubbing of toes. There was nothing unusual in the clinical picture presented by these cases, except that complications such as sepsis were greater in these compound cases.

The Tarsus

THE tarsal fractures are more often the result of falls from heights onto the heels with the knees straight. This is especially true for the fractures of the os calcis and astragalus which form the largest group. If the force of the fall is taken by the toes the fracture may be of the scaphoid or one of the cuneiform bones. These latter bones, however, are frequently fractured from direct violence.

Fractures of the os calcis are more often through the body and are compressed and comminuted. Those of the sustentaculum tali, peroneal process and the posterior superior surface are very rarely observed. These fractures of the body show a broadening of the heel, a filling in of the normal hollow beneath the external malleolus, and usually much ecchymosis and swelling.

An analysis of the late results of these fractures shows a very high percentage of disabilities. Recent investigations into the cause of this show that, frequently, although the roentgenogram does not show a joint disalignment, still the injury has caused atrophy and irregularities in the joint surfaces, particularly the subastragalar joint. The normal arch of the inferior surface of the os calcis is broken down. Treatment must be aimed at a reconstruction of this arch. Several methods are used.

The Cotton impaction method is popular in certain clinics. In this, ice tongs are applied into the body of the bone to secure a strong pull downward, the foot is now placed in plantar flexion, and with a padded mallet the heel is impacted with considerable force. Sometimes it may be necessary to maintain continuous traction with ice tongs for a period of two to three weeks. The Böhler method of treating these fractures is perhaps more commonly employed. In this method Steinman pins are applied through the body of the os calcis and between the lower portion of the tibia and tendo Achillis, so as to obtain a pull downward on the os calcis and forward on the tibia. The fracture is now reduced by steady pressure on either side of the os calcis obtained by a padded vise (redresseur). In both the Cotton and Böhler methods an attempt is made to reshape the bone, which is to be commended. Recently Conn has advised a two-stage procedure. First, the fracture is reduced and a cast applied for four weeks. Then a triple fusion is done of subastragalar, calcaneo-cuboid and astragaloscaphoid joints. The complete relief of pain, with the reconstruction and stabilization of the long arch of the foot is said to more than compensate for the loss of lateral motion. This is of particular importance when the sustentacular shelf has been broken down. In the old cases with persistent pain an operation similar to this has long been advised. For avulsion of the posterior process of the os calcis, immobilization of the leg with the foot in plantar flexion and flexion at the knee only is necessary.

Fractures of the astragalus, though not as common as fractures of the os calcis, are very frequently observed. In our series they constituted 16% of all foot fractures. The greatest point of strain in the astragalus, is through the neck and it is here that it is most frequently broken. There may also be fractures through the posterior process, and of the body. The former are caused by falls upon the heel, with the shearing force of the calcaneus acting upward and cutting off the protruding bone. Pain and tenderness is noted just above and anterior to the insertion of the Achilles tendon. To reduce this fracture, pressure may be made directly upon the fragment, with the fingers on either side of the tendo Achillis, and the foot in extreme dorsiflexion. The fractures of the body are of the compression type, and must be carefully molded into the best possible position, in order to insure a good functional result. This is done by pulling downward on the os calcis, and at the same time flexing, extending, everting and inverting the foot, which will tend to put the parts in their proper relations. Sometimes it is necessary to break up this impaction by means of prolonged traction on the os calcis with ice tongs or a pin. Several days later the molding can be carried out. The fractures through the neck are the most frequent. They are said to be caused by falls upon the anterior part of the foot. Frequently there is considerable displacement of the fragments with the body slipping backward and facing downward. Strong downward traction and plantar flexion is necessary to unlock the body from its posterior displacement. Molding into position is then carried out as stated above. In old fractures of the astragalus a reconstruction operation is indicated. In this the excess bone and irregular joint margins are resected. Sometimes an astragalectomy is definitely indicated. All fractures of the os calcis and astragalus should be immobilized for a period of from six to 10 weeks in plaster. Weight bearing should be allowed gradually after this time, with long arch supports and shoes with orthopedic heels.

Fractures of the scaphoid are rather uncommon. They occur from falls from heights onto the toes. With a fall of this character normally the force is

taken by the scaphoid and transmitted to the astragalus. If this is too great the bone will fracture and usually the upper fragment is forced upward onto the dorsum of the foot. Occasionally by closed manipulation with traction on the toes and applying force downward on the dorsal fragment as the foot is brought into plantar flexion, the fracture can be reduced. If the fragments cannot be brought into alignment they should be removed. The same after-care is indicated as for fractures of the astragalus and os calcis.

Fractures of the cuneiforms and cuboid are most uncommon. If there is a severe comminution of the fracture, these fragments should be removed. The simple fractures of these bones should be immobilized in plaster for a period of about six weeks followed slowly by weight bearing and long arch supports with orthopedic heels to the shoes.

Metatarsus

FRACTURES of the metatarsals are relatively common, and frequently are the cause of prolonged disability. These are often the result of a crushing injury in which a heavy object is dropped on the foot. In most cases there is little displacement but there is a tremendous amount of swelling and pain. It is most important that an accurate reduction be obtained, which will minimize the period of disability.

An important fact noted in the review of cases was the finding of an overlooked fracture of the fifth metatarsal as the cause of persistent pain after what was thought to be a simple sprain of the ankle. It is easy to see how the inversion mechanism of a sprain causes a severe twisting of the head on the shaft of this bone. Seventy per cent of our fractures of the fifth metatarsal were caused in this manner.

The simple metatarsal fractures should be immobilized in plaster for a period of from five to six weeks, slowly allowing weight bearing after this time with the proper protection of the long and anterior arches. If there is difficulty in holding the fracture fragments in place, traction should be applied to the toes. This is preferably skeletal traction with a pin or wire through the terminal phalanx of the toe. The traction should be maintained for a period of about three weeks. This should be followed by plaster immobilization for an additional three weeks or more. Four to six weeks is the minimum time for the immobilization of the metatarsal fractures.

The Phalanges

MOST of the fractures of the toes are due to direct violence. Occasionally the distal phalanx may be broken from kicking a hard object. An "ice man's fracture" is a comminuted fracture of one of the phalanges caused by a block of ice falling on the foot. A plaster splint should be applied preferably over most of the under surface of the foot for a period of three to four weeks. This should be followed by an anterior arch pad and strapping until all pain on weight bearing has disappeared. If there is displacement of the fragments, skeletal traction may be indicated. This should be maintained for two or three weeks followed by plaster immobilization for another three weeks. Fractures of the toes are often accompanied by a tremendous amount of swelling and ecchymosis. Often there may be an injury to one of the phalangeal joints without evidence of fracture which will result in a prolonged disability.

The recent increased use of physiotherapy has brought about a marked improvement in the end results of many of these fractures. When dealing with intelligent patients who can be relied upon to carry out instructions, plaster is necessary for three or four weeks only. Then with callus holding the fragments in position and the patient on crutches with no weight bearing, heat and massage, baths and exercise will do much to strengthen the muscles and ligaments preparatory to walking, as well as prevent bone atrophy and joint stiffness.

The Accessory Bones

THESE extra bones should be briefly mentioned in a discussion of fractures of the foot as they are so often interpreted incorrectly as chip fractures. The most commonly observed ones are: (1) the os trigonum or accessory astragalus which lies posterior to the astragalus; (2) the os peroneale which lies on the outside of the foot in one of the peroneal tendons usually observed opposite the calcaneocuboid joint; and (3) the accessory scaphoid (or prehallux) which is attached to the medial margin of the scaphoid. The secondary os calcis which lies opposite the upper anterior tip of the os calcis well within the foot is not often observed but is frequently reported following injury as a chip fracture of the os calcis. The os vesalianum lying proximal to the proximal end of the fifth metatarsal is frequently mistaken for a fracture. The two sesamoid bones lying in the flexor tendons beneath the first metatarso-phalangeal joint are constant findings and may occasionally be fractured by jumping onto the toes from heights. If there is persistent pain under the big toe a removal of one or both of these bones is indicated.

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Central States Society

THE Annual Meeting of the Central States Society of Industrial Medicine and Surgery, at Peoria, Illinois, May 18, 1937, has the following program:

Treatment of Wounds, by Dr. Darwin Kirby, Champaign, Illinois.

Injuries to the Intervertebral Disc-Roentgen Study, by Dr. Harry A. Olin, Chicago.

The Economic Aspect of Abdominal Drainage, by Dr. J. B. Moore, Benton, Illinois.

Malpractice in Relation to Industrial Surgery, by Dr. Edward W. Rawlins, Chicago.

Medical Problems of the Industrial Commission, by Dr. Philip H. Kreuscher, Chicago.

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A Matter of Circulation

DR. FISHBEIN'S little *reductio ad absurdum* of the recent article in one of the sophisticated magazines of general circulation about a questioned relation between cancer and milk, is characteristically pungent and effective. It is of course, a part of the duty of the editor of the leading medical publication to call the turn on all such abortive ravelings of the "lunatic fringe", even of scientific pseudo-ism. And it is Dr. Fishbein's good fortune that he can discharge this duty with the marked ability that makes it a work of supererogation for other medical editors to add anything to what he says. (See p. 218).

And thus we merely observe—not getting a bit excited, because we believe we can picture what happens in the sanctums where the thoughts of publishing such articles are conceived.

It is a matter of how to get better circulation—meaning, for a magazine, *more* circulation—and the obvious response by way of using one of the oldest methods—namely, start an argument.

In this instance there had to be some care exercised with respect to the subject matter of the argument. And so the process of elimination began.

First, all national advertisers were removed from the possibilities. Second, all potential advertisers of less than national magnitude were likewise taken off the list. Finally, a purely local product was left. And the article about it was launched upon its career of exciting, in innumerable places, and among the innumerable groups who still believe in almanac medicine and curbstone law, the excited question: "Say, did you see that article, etc., etc.?"

Whereupon the newsstands report a sell out, and the advertising rates go up.

It is interesting to speculate as to the reasons why milk was picked on this time. The reasons are just one.

And that one is clearly apparent when the possibilities of milk as a revenue producer for a magazine are contrasted with those, for example, of liquor or tobacco, which, unlike milk, have so little to commend them.

There is, in statistical fact, a very intriguing relation between the statistics of the increased use of tobacco in the last 30 years, and the statistics of the increase in the number of cancers reported in that same period. But, if, as and when any connection between the two is written up, it will be in a medical magazine, and not in a magazine which depends on national advertising for its income. The reason is obvious.

And so we only add to other comments the statement that we also deplore the effects of such articles, on even the sensationally-minded.

The Physical Examination

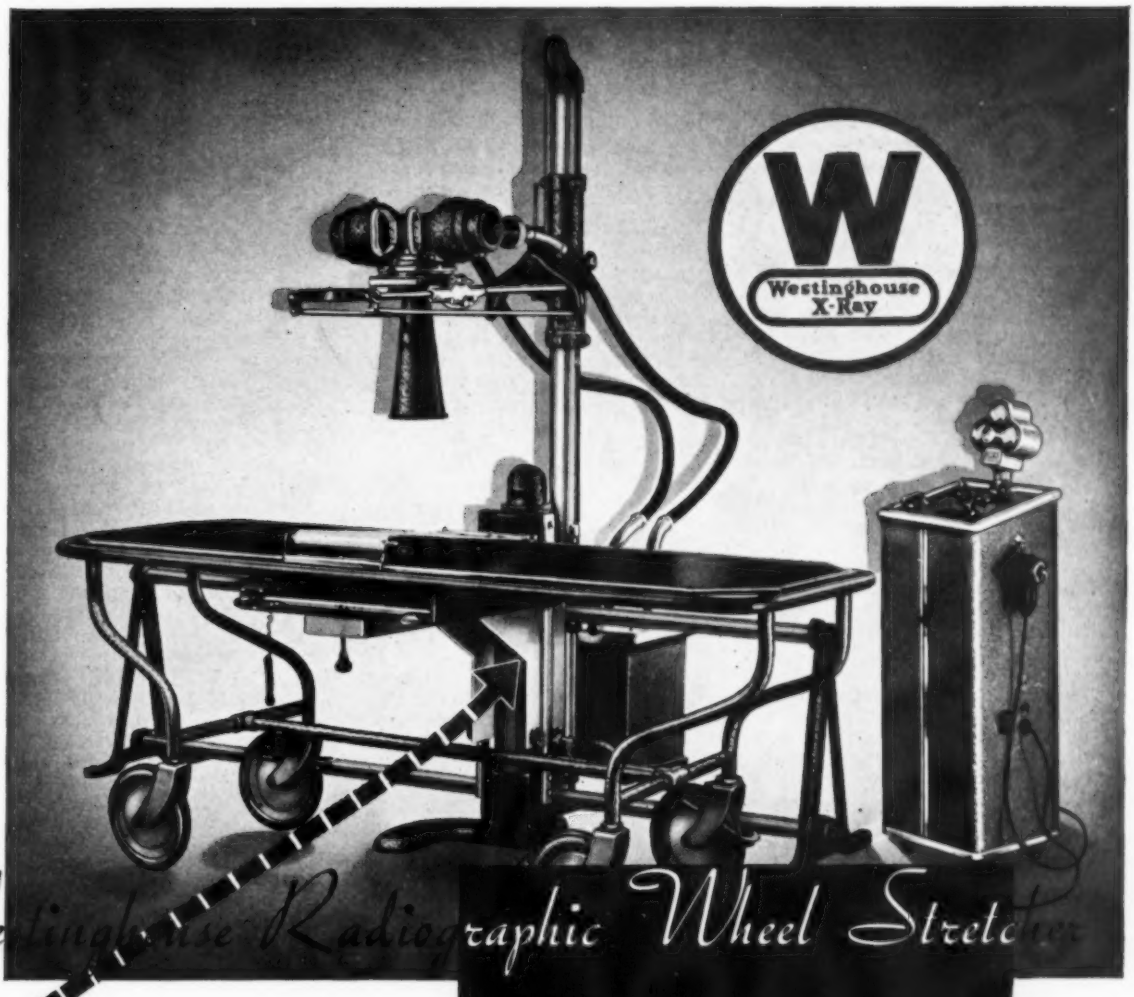
DR. LEROY P. KUHN, well and favorably known to readers of *Industrial Medicine*, as an insurance Chief Surgeon, became so impressed not long ago with the inadequacy of the physical examination made by the doctor not familiar with industrial requirements, but intended for industrial use, that he spoke about it at a meeting.

"The day is passed," he said, "when a doctor can make a superficial examination and get away with it. In order to make a satisfactory examination, the doctor should be alone in a room with the employee where he can carefully go over necessary details. This requires from 20 minutes to a half hour. Physical examinations made in less time are useless.

"In the central states we have had quite a time with physicians and their own 'pet' physical examination blanks—which are about as good as no blanks at all.

"In fact some doctors still offer as scientific medical information a notation, often written on the back of a prescription blank, to the effect that 'I have carefully examined this patient. I have known him for 10 years. I certify that he is physically fit and able to go to work.'"

Nothing is more important in the diagnosis of occupational diseases than the examination. And in a large majority of cases the conditions and factors that make occupational diseases occupational, cannot be discovered except by the kind of examination which even the somewhat limited experience with occupational diseases has proved to be indispensable. So many examinations in industrial work have been improperly made as to cause a number of the men who are speaking and writing about them, to use the term "competent physical examination." The implication is that there are "incompetent physical examinations"—which is not at all according to the high standards of industrial medical practice.



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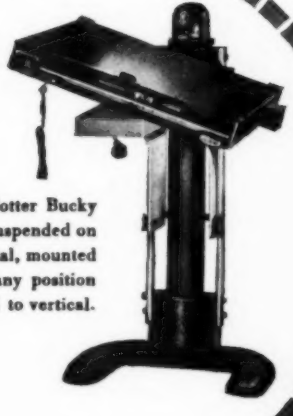

The W flat Potter Bucky Diaphragm is suspended on a heavy pedestal, mounted to operate in any position from horizontal to vertical.

A highly practical modification of the regular Bucky radiographic table —at a substantially lower cost. The patient is placed on the easily moveable stretcher and wheeled over the diaphragm which is suspended on a sturdy, counterbalanced pedestal.

The Bucky wheel stretcher operates in conjunction with practically any existing x-ray equipment, or may be arranged into a self-contained diagnostic unit with the new Fluoradex, as illustrated. *The wheel stretcher is described in Bulletin No. 206. May we send you a copy?*

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LONG ISLAND CITY, N. Y.

Occupational Diseases and Industrial Surgery

Experience with the Injection Treatment of Hernia

THE literature of the past four to five years has been fairly replete with articles on the history of this method of treatment; the number of conservative surgeons taking up this work, if used as an indication of the interest which has been developed in the use of modern, non-sclerosing solutions, would suggest that the medical profession is about ready to give serious consideration to the injection treatment of hernia as an adjunct at least to the surgical treatment.*

My own first interest in the matter was actuated by a paper before the Pan-American Medical Congress to Brazil in the summer of 1934, by a Dr. Harris of San Francisco. He detailed not only the method used by him, but the animal experimentations which had been under way for several years. I was immediately impressed by the economic possibilities of this method in connection with the handling of industrial hernias under workmen's compensation; the experience I have since had with the treatment has not only confirmed these original impressions but has convinced me regarding the practicability of it—provided certain details are strictly adhered to.

My present experience has been limited to the treatment of approximately 100 cases of hernia. This series is too small to be of value from a statistical standpoint and sufficient time has not elapsed so that I may speak authoritatively on the permanency of the cures, except as I have gained knowledge from the results of other surgeons. The group, nevertheless, is sufficiently large to have given an experience from which a few conclusions may be drawn and perhaps suggest a few "ifs" and 'dont's" which may be of interest and value to those of the medical profession who may add this method of treatment to their present procedures.

For purposes of review, I have tabulated the first 57 cases where active treatment has been completed or the cases have otherwise been disposed of—the balance of the group being in various stages of treatment at this time. The 57 cases are classified as follows:

Type	Cases	Hernias
Single indirect inguinal	45	45
Double indirect inguinal	6	12
Indirect inguinal with femoral	1	2
Direct inguinal	4	4
Femoral	1	1
Totals	57	64

Of the total 64 hernias there were:
58—or approximately 91% indirect;
4—or approximately 6% direct;
2—or approximately 3% femoral;
7—or approximately 11% double;
5—or approximately 7% recurrent;
21—or approximately 30% scrotal.

Of the 57 cases, results were satisfactory in 48. Nine, or nearly 20%, were unsatisfactory. Discussion of the nine unsatisfactory cases perhaps may be of more value than detailing the 48 satisfactory ones, and will perhaps bring out reasons why this type of treatment is not always successful and perhaps suggest remedies for it.

Number One had a simple indirect hernia. After three injections this patient moved to Tucson, advising that he would discontinue the treatment.

Number Two had an indirect scrotal hernia and had 14 injections. On the day of the last treatment he drove to California. A letter from him stated that a few days after his arrival, he underwent a pre-employment examination and explained to the doctor why he was wearing a truss. The examining surgeon informed him that hernias could not be cured by injection and that he would therefore be refused employment. This patient has been lost track of. This case brings up the point that in injecting hernias it should be the endeavor of the surgeon to keep cases under observation for at least two years, so that should any sign of weakness develop, additional injections may be given. Any hernia which can be closed by the injection method and which does not stay closed, must be considered as having been undertreated.

Number Three had a double hernia, scrotal on the right and bubonocele on the left. The double truss was unsatisfactory. A single right was therefore applied, and unsatisfactory endeavors were made to retain the hernia comfortably. Injections were started with the idea that when partly closed, the truss would hold it better. After 13 injections and six weeks further observation, a firm, indurated wall had been obtained and the external ring had become very small. Nevertheless, when the truss was off, the hernia would come rolling out, and even at times when the truss was on, the patient stated that it came out. It was finally concluded that the condition was a sliding hernia and the case was operated. Extensive connective tissue had formed in the tissues beneath the external oblique, and a long, extremely thick walled sac, fully patent and dipping into the abdomen through a large internal ring was found. There were no adherent organs within the sac, and the sac was completely formed, showing that it was not a sliding hernia. This hernia probably could have eventually been closed had the exact condition been determined and injections given on the floor of the canal. The lesson to be learned in this case is that in any hernia where injection treatment is contemplated, it is essential that a truss can be worn comfortably and retain the hernia completely within the abdomen at all times and under all conditions. If these conditions are not met with, it can be assumed that there is something wrong, and the case becomes a surgical one.

Number Four had a simple indirect hernia, unsatisfactorily held because of constant complaint of pain from pressure of the truss. This man was given five injections, however, and further investigations, especially with the x-ray, revealed a diseased appendix. The patient was not sufficiently cooperative to return for further observations, and this case is therefore classed as unsatisfactory. Cooperation of the patient is absolutely necessary if this treatment is to be carried to a successful conclusion.

Number Five had a left indirect inguinal, wearing an elastic truss. Against my better judgment, I permitted him to continue with the truss. The first series of injections was therefore unsatisfactory. A second series with a soft roll scrotal pad truss was likewise unsuccessful in obtaining a complete cure. The application of a proper type of truss which will not only hold the hernia at all times, but will also hold the layers of abdominal muscles forming the hernial region in continuous apposition, is, to my mind, the most important part of this treatment. Further remarks on trusses will be made later. In the light of further experience, I am quite sure that this hernia can be completely cured, provided I can regain the patient's confidence and cooperation, and apply the type of truss that I am now using.

Number Six had large direct hernia, which would admit the whole hand up to the knuckles and was given over 20 injections. This case was closed only sufficiently to enable the patient to retain it comfortably with the truss that he was wearing. With further experience and study of the truss question, I am convinced that this case can be practically closed by further treatment.

Number Seven had a double indirect hernia. This patient was fat and heavy, and here again difficulty was had with the early truss which had been recommended for this purpose. A double truss is difficult to fit at all times, and when the pressure is not evenly divided and both hernias perfectly retained, it is better to do them one at a time.

Number Eight had a single indirect hernia. This patient was given a total of 10 injections when the canal was apparently closed. This man was from out of town, and during the last week of his treatment, he was continually intoxicated, and following the last one, he went on a real drunk and left town. Some months later, his wife reported to me that he was still drinking, that his hernia had recurred, and she did not believe it would be wise to attempt further treatment under present conditions.

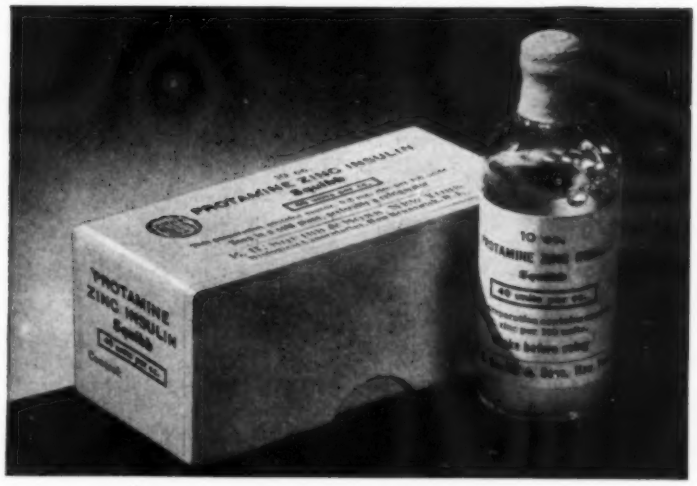
Number Nine: In this case I was unable to fit a truss which would hold the hernia comfortably. Two injections were given under the assumption that if a little closure could be accomplished, the truss would probably hold. The patient, however, was not sufficiently convinced of the success which might be obtained, and did not return for further treatment and observation.

In all of these unsatisfactory cases it can be seen that something was the matter, either with the doctor, the patient, the truss, or the hernia. In the 48 satisfactory cases, however, it is to be noted that when conditions

* R. F. Palmer, M.D., Phoenix, Arizona; read before the Maricopa County Medical Health Society; published in *Southwestern Medicine*, March, 1937.

Announcing . . .

PROTAMINE ZINC INSULIN, *Squibb*



Hagedorn, Jensen, Krarup and Wodstrup-Nielsen of Copenhagen reported, in 1935, that by addition of protamine to aqueous solutions of the active anti-diabetic principle they had succeeded in obtaining a modified, precipitated preparation having an effect much more prolonged than that of unmodified Insulin. Later it was demonstrated, at the University of Toronto, that by adding a small amount of zinc to a preparation of Insulin and protamine, both the stability of the preparation and the duration of its blood-sugar-lowering effect could be increased. These findings have led to the evolution of a product now designated Protamine Zinc Insulin. This product has been given extensive clinical trial and signifies a distinct advance in treatment of diabetes mellitus.

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are right and full cooperation is secured, good results can be obtained.

Complications: There have been no complications of moment. Four hydroceles of the cord in scrotal hernias, have all absorbed. A number of the cases have had temporary swellings of the cord. At the present time, I am endeavoring to get swelling of the cord, for then I know that I have the canal and ring sufficiently closed to interfere with return circulation. If the cord in an indirect hernia does not swell I have come to feel that sufficient closure has not been obtained.

The methods: Details of method will, of course, vary with each surgeon's ideas. Some will begin in the external ring, others will start in the internal ring, and perhaps some will start in the middle of the canal. I do not see that it makes any particular difference where the first injections are placed, provided always that the surgeon is sufficiently conversant with the anatomy of the region to know that he is getting his proliferating solution well distributed throughout the canal, and especially in the upper end, so that the hernia cannot protrude into the canal.

Solutions: A great number of solutions are being put on the market. I have tried several of them, but continually go back to proliferol, plus occasional boosting injections with thuja. Dr. Frank Girard recently informed me that on a recent visit to Chicago and other centers where hernias are being injected, he learned that the Ulmer Company had developed a new solution under the name of Proliferol "T"; this solution has 5 c.c. of thuja incorporated in 60 c.c. of proliferol. I have not tried this solution, and probably will not, because it can be made extemporaneously and in such proportions as desired to meet the indications in the individual case.

Trusses: In my first work, I used the ordinary scrotal pad type of truss which was originally recommended for this treatment. All authorities seem to agree that the essentials of a truss are of a spring type which will hold the hernia within the abdomen at all times. From my own experience, I have concluded, however, that the scrotal pad truss is not suitable for this type of treatment, for the reason that the lower end of it rests on the pubic bone and does not permit the truss to sink in, on the canal, to keep its walls in apposition during the treatment period. If the action of this fluid is to produce a connective tissue overgrowth, it must be assumed that the tissue in the early stage of injection is soft and pliable. Like any other scar in a region which is moving continually, if the edges and opposing surfaces are not held closely together, the scar is not going to be thin and closely adherent, which seems to be the essential condition to be obtained. Six or eight months ago, I tried out a truss known as the Injecto truss—developed by the Ohio Truss Company. This truss is so arranged that the pressure is directly through the inguinal region to the back of the hip, and the pad fits well in above the pubic bone, holding the tissues perfectly together. More recently while in San Francisco, I made arrangements with the Hittenberger Appliance Company to make me an assortment of pads, which when attached to a spring frame of the Smithsonian type, will, I believe give greater satisfaction.

1937 Annual Meeting, Detroit, Michigan, May 6-7.
In Conjunction with
Mid-West Conference on Occupational Diseases
and
Annual Meeting of Michigan Association of
Industrial Physicians and Surgeons

THE BULLETIN

of

The American Association of Industrial Physicians and Surgeons

THE object of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for the mutual advancement in the practice of their profession.

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"Is Milk Cancer's Ally?"

IN AN editorial a few weeks ago The Journal* condemned the editors of Esquire and Coronet for printing articles in the medical field without scientific background. Their ignorance in accepting and publishing such articles as they have published on the glands and on autotherapy was a sort of unfortunate, supercilious or silly ignorance. Now in the March issue of Coronet they lead off with an article entitled "Is Milk Cancer's Ally?" that betrays such a broad and comprehensive ignorance of milk and of cancer that one is stimulated to

* *J.A.M.A.*, March 11, 1937.

OCCUPATIONAL DISEASES

The General Assembly of the State of Illinois has recently passed an Act, covering occupational diseases of Industrial employees. This Act is particularly concerned with diseases of the lungs, and poisoning from certain chemicals.

Under this new law it will be necessary for many industries to examine their present employees, and new employees, to determine their present health status and thereby prevent future liability.

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1. Holmes and co-workers — Indust. Med., July 1936.
2. Beard — J. Am. Diet. A. — 10:193 (1934)
3. Gardner and Gardner — Am. J. Dis. Child. 47:1261 (1934)
4. Cameron — J. Am. Diet. A. 11:189 (1935)

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wonder as to the mental age of both editors and authors of this publication. Here is the old argument that modern civilized man died of cancer **but the American Indian did not die** of cancer. The answer is of course that modern civilized man has a life expectancy of some 60 years at birth whereas the life expectancy of the Indians was about 30 years at birth. The Indians simply did not live long enough to die of cancer. More than 90% of deaths from cancer occur in persons over 40 years of age. The Indians died of infectious diseases, exposure and other Indians. The same argument has been made with relation to the eating of white bread versus the eating of whole grain. It might just as well be made with relation to automobiles. The Indians had no automobiles; hence the Indians did not die of cancer. Some preposterous arguments are made to show that cancer rates are higher in the states using the most milk. It may easily be shown that life expectancy is longer in the states using most milk because of better nourishment in those states. In some small type at the end of its article Coronet affirms its seriousness in presenting this article; this affirmation adds insult to injury. There is evidence that the article has already produced fear in the minds of some readers who do not stop to remember that neither the author of the article nor the magazine that prints it has the slightest scientific standing.

National Congress of Industrial Medicine

THE twelfth National Congress of Industrial Medicine took place recently at Naples under the presidency of Prof. Nicolo Castellino.* Respect was paid to the memory of Prof, Luigi Devoto, recently deceased, founder of the first clinic for the treatment of industrial diseases and the president of the Societa di Medicina del Lavoro. The first official topic concerned pathology from modern industrial chemistry. Professor Castellino said that physicians have to be familiar with the reactions to substances used in industry to prevent and treat the pathologic conditions that may result from intoxications or other forms of contact of workers with industrial substances. The development of modern working methods may result in physical and psychic disturbances of workers, which may be as serious as those caused by contact of the organism with chemical substances.

The subject of the second topic was ear diseases from noise. Professors Bruzzi of Naples and Malan of Turin were speakers. Ear diseases from noises are of great importance in industrial medicine, as they may develop in several modern industrial fields. Noise is the stimulation of the hearing apparatus by periodic and nonperiodic vibrations in association, causing, respectively, specific and nonspecific sensations in the human hearing apparatus. The latter collects the sounds induced by from 16,000 to 20,000 Hertz waves. Infrasounds (lower than 16,000 Hertz waves) and ultrasounds (beyond 20,000 Hertz waves) stimulate the

* Italy Correspondent, *J.A.M.A.*, March 13, 1937.

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1937 Annual Meeting, Chicago, September 20, 21 and 22.

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(See Page 203)

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1937 Annual Meeting, Jacksonville, Florida.

(See Page 195)

hearing apparatus with nonspecific sensations and may produce alterations. The most harmful effects from stimulation of the zone of maximal sensitivity of the human hearing apparatus are those produced by intense sounds of 23,000 Hertz waves. Trauma from noise may be acute or chronic. The slow and benign evolution of industrial deafness, the absence of lesions of the middle ear and of symtoms from the vestibule, heredity and constitutional and endocrine predisposition of the worker are all factors in making a diagnosis. The speakers described the forms of deafness that develop in tinkers, weavers, railroad men, aviators and artillerymen. Early development of progressive lesions and failure of the treatment is improving the patient's condition are common characteristics of industrial deafness.

The third topic was disease of the spine from work. Prof. Luigi Preti of Milan spoke on the causation of the condition. A process of degeneration of the intervertebral disks which is stimulated by continuous flexion, extension and bending of the spine during work is the most important factor. Degeneration of the vertebral disks is followed by a process of irritation of the periosteum of the entire vertebra, with possible consequent ossification of the periosteum and final destruction of the involved vertebra. Professor Prisco of Naples classified industrial spinal diseases in four groups: Those developed from repeated abnormal movements or effort of the spine, vertebral arthritis and diseases which seem to be related to infections that take place during work or with industrial intoxications. Diseases of the first group develop from para-industrial defective conditions of the worker stimulated by conditions of work beyond his individual resistance. Spondylitis deformans and apophyseal arthritis are the most frequent forms of vertebral arthritis in workers. They are the result of kinetic efforts which are necessary in performing certain types of work and have to be considered industrial diseases, especially from the point of view of medical insurance.

Professor Caso of Naples said that the dynamic, mechanical and physical agents which most frequently cause spinal diseases during accidents in work are acute efforts, violence, falls, contusions, wounds and shock from either atmospheric or industrial electricity.

The fourth topic, obligatory insurance of workers against industrial diseases, was discussed by Professor Ranelletti of Rome. For the last two years, insurance against poisoning from lead, mercury, white phosphorus, carbon sulfide and benzene has been obligatory in Italy. Also insurance against ancylostomiasis is obligatory. The speaker reviewed statistical data obtained in Italy for the last two years in relation to frequency of denunciation, harm caused to workers from different diseases and the amount of money paid for indemnification and compared the data with those obtained in other countries. He advised that industrial medicine be more thoroughly taught in Italian universities.

Professor Aiello of Milan discussed the last topic, which was the mutual type of health insurance, a type of health insurance, a type of social insurance which is developing at the present in the departments of the ministry of working corporations in Italy.

The next Congress of Industrial Medicine will take place at Bari city.

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Rockford, Ill.

Life Extension Institute Enjoined from Practicing Medicine

THE Life Extension Institute, a New York corporation, has been enjoined from practicing medicine in that state.*

Since the date of its organization in 1914, this corporation has been engaged in promoting and conducting periodic medical examinations on a nation-wide scale. It has had contracts with large insurance companies for the annual examination of policyholders through local cooperating physicians paid by the corporation.

It has made similar services available to individuals. While the medical examinations were made by local physicians, the reports were forwarded to the central office of the corporation and there reviewed by its medical staff. Suggestions with respect to needed medical treatment were outlined by the home office and transmitted to the examinees. Urinalyses four times each year constituted a part of the services rendered by the corporation to examinees. For making these physical examinations and for reporting to the examinees, the institute made a charge considerably in excess of the amount paid by

* *J.A.M.A.*, November 14, 1936.

it to local examining physicians. In 1935 the state instituted proceedings in the Supreme Court of New York, New York County, to dissolve the corporate status of the corporation and to revoke its charter on the ground that its activities constituted the practice of medicine, in which pracice it could not lawfully engage. By consent of the parties, the Supreme Court appointed a referee to determine the issues.

After a number of hearings but before the state had finished presenting its evidence against the Life Extension Institute, the hearings were suspended because of negotiations between the Life Extension Institute and the state's attorney general to effect a settlement out of court. A stipulation was signed by the institute and by the attorney general in which the institute voluntarily assented to the entry of a decree against it, to embody the prohibitions and other provisions contained in the stipulation. The decree was thereafter entered enjoining the corporation from "practicing medicine and/or from holding itself out as being able to diagnose, treat, operate or prescribe for any human disease, pain, injury, deformity or physical condition and/or from offering or undertaking, by any means or method, to diagnose, treat, operate or prescribe for any human disease, pain, injury, deformity or physical condition."

Futhermore, the decree specifically denies to the corporation the right to engage, directly or indirectly in making physical examinations or reports and recommendations based on such examinations and from employing any physician to perform these activities for it. The corporation is permitted, under the decree to maintain laboratories and to employ physicians to perform such services as may be legal and proper in connection with the operation of such laboratories. The corporation may, for compensation, supply "services" to physicians and others, when such services do not constitute the practice of medicine. It may not, however, receive any part of the compensation paid to physicians for the rendition of medical services. The corporation may not direct, supervise or control the medical services rendered by any physician who has been furnished any "services" by the corporation. The corporation may furnish to any physician who is interested in and specializes in life extension work "offices, laboratory facilities, work, or services, financial assistance, clerical and other lay help, files, records, data, statistics and any other utilities or services not of a medical character." It is expressly stipulated, however, that the corporation may in no event receive from such physicians compensation constituting "an interest, direct or indirect, in fees to be paid said physician or group of physicians for professional services in the practice of medicine."

In view of the stipulation and the decree that was based thereon, no judgment was rendered dissolving the corporation.

Under the decree, the Life Extension Institute may continue to exercise corporate powers but may not practice medicine, directly or indirectly, in any form. The referee, in the opinion that he filed along with the entry of the decree, emphasized the fact that a statute prohibiting the corporate practice of medicine serves a wholesome purpose, because the relation between a physician and his patient is and must be a personal and confidential one, which can exist only when the physician is a natural person.

The Association for the Advancement of Industrial Medicine and Surgery

Inc.

Executive Office - 370 Lexington Avenue, N. Y. (Room 904)

PURPOSE: *To disseminate accurate medical knowledge in reference to the diagnosis and treatment of all conditions arising out of and in the course of employment.*

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1937 Annual Meeting, December 15, at Electrical Auditorium, Grand Central Palace, New York City.

Health Enemies in Industry

ACCIDENT prevention and safety work have been outstanding accomplishments in industry during the last two or three decades; as a result, industrial accidents have been materially reduced.* It would appear

* LEVERETT D. BRISTOL, M.D., DR. P.H., Health Director, American Telephone & Telegraph Company, in *Safety Engineering*, March, 1937.

DUST IN INDUSTRY — What the hazards are; how to determine their existence; how to combat them.

INDUSTRIAL DUST

Hygienic Significance, Measurement and Control

By Philip Drinker *and* Theodore Hatch
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This book covers the problem of dust control in its relation to the health of workmen, emphasizing the cooperative nature of the problem both for physicians and engineers, and presenting principles, methods and data for the design and operation of dust-control equipment. It discusses the physical aspects of dust and fume suspensions and their effect upon man; the analysis, measurement, and microscopy of fine dusts; and the practical control of dusts and use of respiratory protective devices.

INDUSTRIAL MEDICINE
844 Rush Street,
Chicago, Illinois.

that the time is now ripe for a well-organized attack on industrial sickness and accidents off the job. Health conservation and sickness prevention must be added to the accident prevention and safety program!

Believe it or not, there would seem to be fads in accidents, just as there are in so many other phases of human existence. Statistics show that slipping in the bathtub on Saturday night has given way to slipping on the kitchen floor on Saturday afternoon! To be kicked by a mule is no longer in style—one must be hit by a bumper or thrown through a windshield in order to attain the utmost of social sympathy and acclaim! Accidents at work are being superseded by accidents at leisure!

The personal injury accident, occurring while off duty and resulting in lost time accounted by many industrial companies as sickness disability, has moved up to join respiratory and digestive disorders as one of the leading causes of suffering and distress among industrial workers, and in many communities may now be ranked as Health Enemy Number Three. Moreover, it has been found that compared with accidents while at work there may be over three times as many accidents off duty, and over five times as many days lost from such accidents.

The prevention of home accidents particularly requires serious attention. Only in the field of home safety do accidents continue almost unabated. Both the human element and the home environment are the factors to be considered. To a large degree, the problem is one of education of individuals, preferably in employee, family and home groups. Ignorance and indifference must be dispelled, and proper methods of using home facilities and equipment must be learned. Automobile, traffic and transportation accidents continue to be real menaces to industrial workers, as well as to the public in general. In this connection it should be remembered that if often is the pedestrian or the driver, rather than a machine, who "goes out of control." Such an individual may need a physical and mental overhauling and reconditioning to make him safe for highway democracy!

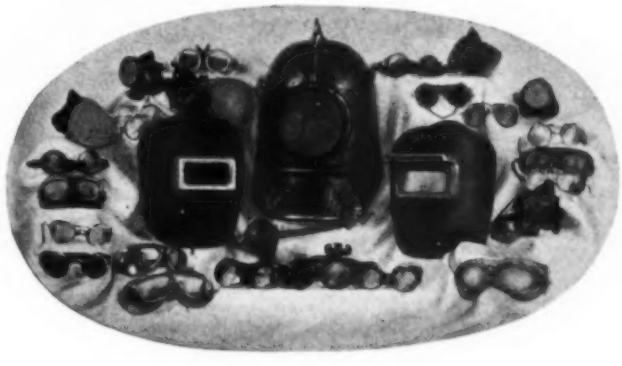
It is now well established that certain persons, the so-called "accident-prone," may have a special liability to be the subjects of accidents, just as some individuals are particularly susceptible to certain diseases or physical ills. In both cases prevention is largely a matter of building up resistance. A high degree of immunity to accidents can be acquired by safe methods of thinking and acting, based upon a complete knowledge of one's physical assets and environment. The best accident prevention "vaccine" or "serum" is a deep "injection," repeated as often as may be necessary, into the mind of every individual of the fact that personal safety pays dividends, and that a careless man or woman is just "an accident going somewhere to happen"!

The rapidly increasing organization of Bureaus of Industrial Hygiene in state and local Departments of Health during the past year; the passage of laws in several states providing workmen's compensation for certain occupational diseases; the need for defining the functions of health and labor departments as pertain to activities in this field; the questions as to the relative positions of the physician and the engineer in the industrial health program; the proper relationship between industrial medical departments and the private practice of medicine; the better balance between health and safety activities in industry; the problem of how best to furnish much-needed industrial health and medical services to the vast number of small business concerns; and the constant requirements of improved medical and surgical technique in industry would seem to call for more and more attention to the Industrial Health Program.

There are in general six groups of activities which go to make up a well-rounded industrial health program; these are: (1) Keeping of sickness records; (2) Communicable disease control; (3) Tuberculosis control; (4) Occupational disease and accident control; (5) Personal and environmental hygiene; and (6) General health publicity.

Accurate and systematic record-keeping of employee deaths, sickness, and accidents, as well as of industrial health services and activities, is fundamental in any satisfactory program. Therefore the development of an adequate recording and reporting system is essential.

While the control of such diseases as smallpox, typhoid, and diphtheria rests largely with the community health authorities, industrial organizations may do much to assist the



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public agencies in this respect by including attention to this subject in their own industrial health programs.

It is apparent that the control of tuberculosis among industrial employees is receiving considerable attention. That there is room in many organizations for additional effort in reference to prompt and adequate medical, nursing, and institutional care of cases is evident. Early physical examinations and diagnoses and the more complete and extensive examination of employee contacts are among the necessary requirements in the further development of the tuberculosis program in industry. Tuberculosis still is a leading cause of sickness among industrial workers, particularly of the younger age groups.

Although industrial managements cannot be expected to take over the responsibilities of individuals, private doctors, or community health and safety authorities, most certainly there is an opportunity, if not a definite responsibility for industries to be interested in and to inaugurate programs for the control of such conditions as tuberculosis, heart disease, the common cold and accidents off the job, as well as the so-called occupational diseases and accidents. The practice of good health and safety habits on the part of employees, and the practice of good plant sanitation and safety on the part of management, should be objectives of prime importance in every program of industrial hygiene.

While occupational diseases are relaitvely infrequent as compared with industrial accidents, there is a definite trend in several states toward the increasing of compensation coverage, with the inclusion of certain occupational diseases as well as accidental injuries. This naturally emphasizes the fact that all programs and services must take into consideration the important occupational diseases. Because of the fact that occupational diseases affect only a few of those exposed, are sometimes difficult to diagnose, vague in symptoms, slow in onset and frequently hard to treat successfully, facilities for prevention and expert treatment should be available in all industries where possible hazards exist.

Carbon monoxide poisoning, unless properly guarded against, occasionally may affect workers in the manufacture or servicing of illuminating gas; in fire and boiler rooms; in company garages; and in various types of manhole and trench work. Lead poisoning is one of the hazards of working with lead pipes and cables, or in the reclaiming of lead junk. Naphthat and benzol poisoning may at times appear among employees as a result of improper methods of painting, lacquering or cleaning operations.

Gas works, tar and pitch and the long-continued handling of tarred poles and other tarred material occasionally may be the cause of various types of preventable skin disorders, the most serious of which may be a form of skin cancer. In addition, the ill effects of other physical and chemical agents and various kinds of dust must constantly be guarded against, including such diseases as silicosis.

Attention also should be called to the vital importance of prompt treatment of minor wounds for the prevention of infection. It is at this point where accidental injury may result in serious disease. All open wounds are potential sources of infection, wherein disease germs may gain access into the blood and body; they should receive immediate first aid treatment with a suitable antiseptic or germicidal preparation. A tradition of many industries is the particular care taken in dressing wounds.

In general it may be said that most industrial organizations have developed fairly adequate programs for the promotion of environmental hygiene, including all those factors having to do with general and special sanitation, safety equipment, lighting, heating, ventilation, and food and milk control in lunch-rooms and cafeterias. However, just as the newer public health has stressed individual personal hygiene, so also must a newer industrial health place greater emphasis on the physical and mental condition of the individual worker. This means that more attention in the future must be focused on: (a) various types of medical examinations, preemployment and periodic; (b) seeing that the employee gets the right type of medical, nursing, nutritional, or institutional care that he or she may require; (c) better followup and supervision of sickness and accident cases; (d) adequate health and safety education of the individual workers; and (e) personal health supervision somewhat analogous to the very efficient safety supervision that that become a part of all enlightened industrial policies and practices.

General health publicity is one of the important phases of the industrial health program. No one method of health publicity will reach all employees. Some are attracted by booklets, others by "talkies," others by posters, others by magazine articles on health subjects, and still others by question and answer columns. This means that a well-rounded program, to reach as many employees as possible, must include all methods, so far as economically feasible.

Regular magazine or house-organ articles on health should be a part of every company's program; these should be supplemented periodically by special bulletins and leaflets. In large industries more attention should be given to the development and organization of facilities for addresses, lectures and group conferences and classes on health subjects. Visual

The Industrial Doctor

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1937 Annual Meeting, Corning, New York.

education on health topics, including health posters, motion and talking pictures and attractoscopes should be more generally used.

The key person in the industrial health program should be the foreman or supervisor. The ultimate responsibility for the health supervision of individual employees among general manufacturing and operating forces will rest with the supervisors, such as supervising foremen and foremen, chief clerks, local managers, chief operators, and other group leaders. Frequent personal contacts between a company medical department and individual workers are impracticable and often impossible. First line supervisors, however, have the opportunity to observe possible day-to-day changes in a fellow worker's physical appearance or mental attitude. The majority of supervisors are definitely interested in the welfare of their workers; it is not difficult, therefore, to get them to see that the health of their subordinates is a part of their job. The problem becomes one of developing effective supervisory methods for promoting health among employees.

The health of the supervisor himself or herself is of paramount importance, not only as regards the quality of supervision, but also as it affects relationship to individual employees.

The management officials of industrial organizations, where feasible, should provide thorough physical examinations of all supervisors and an adequate system for the follow-up and correction of defects and impairments which are found. Starting with the supervisor's own health and working environment is the best point of departure for the development of the entire industrial health program. Moreover, it is certain that unless the supervisor is "sold" on health, few if any of the fellow workers will become health-minded. As a matter of fact, the health program in industry must be developed from the top down, so far as officials and workers are concerned, rather than to attempt to push it from the bottom upward through the lines of organization.

In carrying on his or her duties the supervisor needs the support and assistance of operating management and of the health specialists, such as doctors, dentists, engineers, nurses, and nutritionists, but the results achieved will depend largely upon the supervisor's own efforts, In former times health was neither an industrial subject nor objective; the manufacturing or operating supervisor concerned himself or herself with job routine only and was not supposed to assume any responsibility for the health status or safety of fellow workers. At the present time, with industrial health becoming something more than control of specific occupational hazards, personal health guidance of working forces should become an essential part of supervisory routine.

The industrial supervisor of the future must have a dual responsibility—that toward the actual work at hand and that toward and with the workers supervised; he will promote not only industrial safety, but industrial health as well!

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A Philosophy of Life

OBSERVED through the Christian world, Easter marks the resurrection—the triumph over death.* The day and the occasion typify a beginning, a new outlook. The responsibility of carrying on had been left with the Disciples. Theirs was not to turn back, to live in the past, to mull over the days when the Son of God walked among men. The fiat was: Begin here and now!

I wonder how many of us are handicapped by too much introspection—looking within; too much retrospection—looking backward. We can waste a lot of mental energy by gazing toward the rear, going over the mistakes of yesterday. Then, too, we can worry so much over the present that our whole objective is defeated. Before we sense the flight of time night is upon us and we then realize that we have squandered precious hours. The load of today is heavy enough without the burdens of regret. When tomorrow's tasks are anticipated and failures prophesied efforts are thwarted.

EVERY one should adopt a philosophy of life, one that has health and well-being as a firm foundation. No one who suffers from chronic indigestion can face a new day with joy, hope, and ambition. In large measure our outlook depends upon a clear brain and a clean tongue. The one who has clogged the digestive

* DR. IRVING S. CUTTER, Health Editor, *Chicago Tribune*, and Medical Director, Chicago & North Western Railway, in *Chicago Tribune*, Sunday, March 28, 1937; copyrighted *Chicago Tribune*.

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tract, who has dipped deep into the fleshpots, gazes upon everything about him with a liverish eye. Mental processes reflect physical balance and an alert mind demands a sound body.

One may well fear that far reaching decisions—full of error—may occasionally come about because an overplus of toxin of some sort has warped thinking. Reason rarely reigns in an aching head or a diseased frame. How true it is that work—performance—savors of the workman, the producer. It makes but little difference what the nature of the task. If impure or poison laden blood is flowing through heart and brain, what may we expect of judgment?

Perhaps we can say with the shepherd in "As You Like It," "I am a true laborer; I earn that I eat, get that I wear, owe no man hate, envy no man's happiness, glad of other men's good." But, you answer, "What meager needs, what a simple faith." After all, the plainest things in life are the most genuine, the most desirable. What an armor of artificiality surrounds elegance. Faith can never be adorned. Such a one need not answer the question of Job, "If a man die, shall he live again?"—because he knows.

Physicians as a group work in the shadowland of life and they come nearer sensing the beliefs of mankind than any other class. Science has failed to penetrate the mystery of life, and in an attempt to solve the riddle one would emulate the squirrel incessantly spinning the wheel within his cage. To us mere mortals the question is unanswerable. But we can distniguish between the Cyrenaic rout and productive living.

It is required of every one that he have some regard for his fellow man. "Ye must be born of the Spirit," was the answer of Jesus to Nicodemus. This is the characterization of the true physician. As Sir Thomas Brown put it in "Religio Medici"; "Thus we are men and we know not how; there is something in us that can be without us and will be after us; though it is strange that it has no history, what it was before us, nor cannot tell how it entered us."

BUT why all this rambling? Because a want to anchor to something those who have lost, perchance, faith and hope and a sense of worthwhileness. There are many such, and how they do need understanding—not shelter and food, but encouragement that can come only from human hearts. Their desire is to preserve sanity—ours to restore them to independence among men. No! I do not refer to derelicts alone, but to many from all classes of society whose tenets have been shattered rudely.

Perhaps, after all, some may, with Cicero, come to the conclusion that they would rather be mistaken with Plato than be right with those who deny life after death.

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1937 Annual Meeting, Detroit, May 6-7.

Health and Absenteeism

THIS is a matter well deserving of our careful attention* . . .

What are the factors in a worker's life that make or mar his health? Clearly of paramount importance is the nature of his work and the conditions under which he carries it out. We will not consider that now because medical supervision of his work comes within the factory walls. But the worker has a life outside the factory, at least in this country. A worker's life beyond the factory starts when he takes his tram or bus home. It continues with his evening meal, and with his rest or reaction after feeding. Further, his life is diffused with the personal relations of his home circle and has as a background the home itself. At once there is called to mind such domestic problems as inadequate space, poor washing and eating amenities, the question of how to make both ends meet, the difficulty in obtaining proper rest and relaxation and other hardships which are such wretched features of many workers' homes to-day.

An enormous field for medical supervision is now opened out. To some extent the present public health services attempt to deal with these problems, particularly through their excellent sanitary inspectors. Moreover, the panel medical service is essentially medical supervision of the worker outside the factory, but there is a gap in this for workers from 14—16. . . .

After girls have been in our factory a year I see them again to weigh them, to review their absenteeism, and talk over with them anything which appears pertinent to their health. For the last 12 months particular attention has been paid at this interview to the question of diet. It has surprised me very much to find how inadequate this often is. "I'm ever so dainty in what I eat" is a type all too commonly met with. "They call me the bread-and-butter girl" was the confession of one extremely anaemic patient. There are two important articles of diet frequently lacking, namely, green vegetables and meat.

I have set out a simple statement on diet for distribution to our girls. I also get our visiting nurse to call at the home of girls whose diet is badly balanced and talk to the mother about the subject. This is a very useful development of the duties of a visiting nurse and is a relief from the unavoidable necessity to use her in the main as a visiting policewoman. On the whole mothers are well informed about diet, and where finances permit, will buy good food.

Meat is very expensive, and it is often left out for this reason. Fresh

* T. O. GARLAND, M.B., CH.B., D.P.H., Medical Officer, Carreras Ltd., in *Labour Management*, February, 1937.

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CLINICAL SAMPLE AND INFORMATION GLADLY SENT ON REQUEST

greens are not always expensive, but the difficulty of obtaining fresh water in working-class houses is often not considered in this connection. The Committee against Malnutrition investigated the supply of fresh water in twenty-five poor families in Finsbury. Out of these only three had water laid on inside the dwelling; five had the water supply on the landing, and with the remaining 17 the only available supply was in the yard or basement. Every drop of fresh water used in these homes had to be fetched up in buckets or jugs. A diet expert may explain the value of fresh green vegetables, but before eating them it is imperative that they should be well washed, and if a housewife has to go down to the basement, or out into the yard, with all the paraphernalia of knives, basins and buckets for refuse, it is not just ignorance that stops them buying so little green-stuff.

The question of food storage also arises if the housewife is to make the best use of her money to buy an adequate diet. To be economical, food must be bought in sufficient quantities and stored until required. For this a cool cupboard or pantry with ventilation to the open-air is necessary. But none of these 25 homes had pantries, four only had ventilated cupboards, and 21 had a non-ventilated cupboard as the only place in which to store food. In 14 cases, too, the cooking apparatus was in the main living room without a separate sitting room.

Ignorance and idiosyncrasies are factors in poor diet too. One mother, to whom I sent our nurse recently on this matter, answered that she always provided the right food, but several of the children would not eat greens or meat "all along of dad," who was a good living man but very pernickety about his food.

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A POSTCARD addressed to Industrial Medicine with your name, and the number as below, or—YOUR LETTERHEAD sent to Industrial Medicine with the number, as below, will bring you the article, reprint, pamphlet, description, or catalog, so designated:

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1-403 The Colorimetric Determination of The True Acidity of Gastric Contents
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(See Page 213)

For some time now I have asked all new entries whether they had a bed to themselves at night. Remarkably few of our girls seems to enjoy this luxury. I do not mean to say that it is impossible to rest if you share a bed. There is no doubt in fact that rest is sometimes better this way, but it is worth pointing out that I have seen one girl who had to share her bed with three others, another girl of 15 who still slept in the same bed as her parents. and in the lodgings of some girls we had taken on aged 18—22 (who had recently come down from an industrial area in the north) three girls shared a single bed with two more sleeping on the floor in one room, which they used moreover as their sitting room and their kitchen, too.

Apart from the question of actual sleeping accommodation, the accommodation for just mildly relaxing after the meal is often missing. Workers in families, where they have but one or two rooms in which to cook, sleep and carry out the many intricacies of domestic life, have little opportunity for sitting down quietly to read, to think, or just to sit, as we have in our homes, and there are many thousands of such families in every borough in London. Many girls and youths are driven out into the streets after the evening meal for no other reason but that they have nowhere to sit down at home.

For many girls, getting home does not just mean lack of rest, it actually means more work. I am constantly finding that a girl has to do her own housework and cooking when she gets home. It is not so bad when it is just for herself, but where the mother of the family has died, or is an invalid, it is often a case of cooking the evening meal for the whole family, or she has to spend her whole weekend catching up arrears of housework that have been neglected during the week.

I still do not pretend to have covered all the ground that is implied in the title of this address. Many important questions are undiscusssed. For example, workers to be healthy need proper holidays with pay, and they should be paid when they are ill. The struggle for existence still goes on whether they are well or ill, and it is poor therapeutics to saddle your ill worker additionally with financial worry, resulting as it so often does, in his coming back to work before he is fit, because he cannot afford to stay away any longer. Moreover, a willing worker, who is a reasonable person and sufficiently skilled at his job, should be assured of the opportunity to work and not have a constant fea of unemployment hanging like grisly spectre over the home. These are matters of great social magnitude. I look forward to the time when there is a socially minded doctor in the Cabinet and then we can start with medical supervision at the fountain head.

THE discussion was opened by Dr. May Smith, Investigator to the Industrial Health Research Board. She said that Dr. Garland's most interesting and salutary paper has served to emphasise the amazingly complicated web of causes arising from the study of a firm's industrial sickness absence. It is necessary to note that sickness absence is not the same as sickness. Dr. Garland's obervastions clearly show that the very closest relationship ought to exist between all the bodies concerned with public health. The medical officer as such cannot hope to attack all the problems. He may have to content himself with a study of the facts making for health or sickness within the factory environs—in itself no mean matter—but he can show by his detailed and specialised knowledge of a small group where external bodies, such as government departments, transport authorities, medical organizations, ought to display more activity.

Many points touched on in this paper might well provide the basis for further discussion; for example. ought an industrial organisation to attempt to house its workers? Should it arrange for its own transport with the existent organisations or leave it to the workers? Should local labour be selected wherever possible, and if so, for what class of labour? Should workers be paid extra when ill?

These problems are not matters merely for personal opinion or prejudice, but for careful research.

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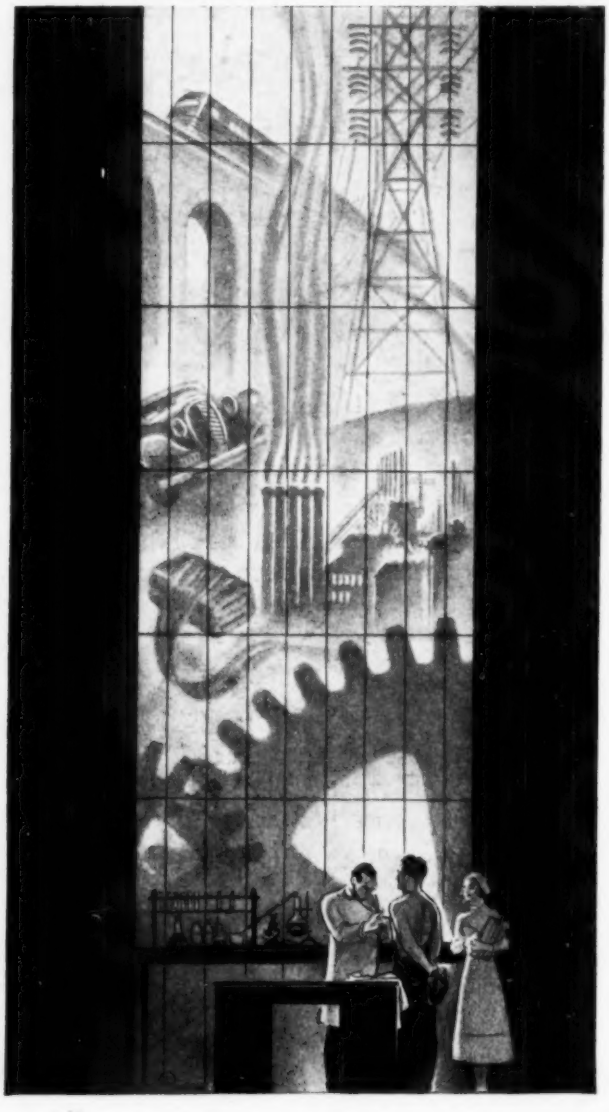

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